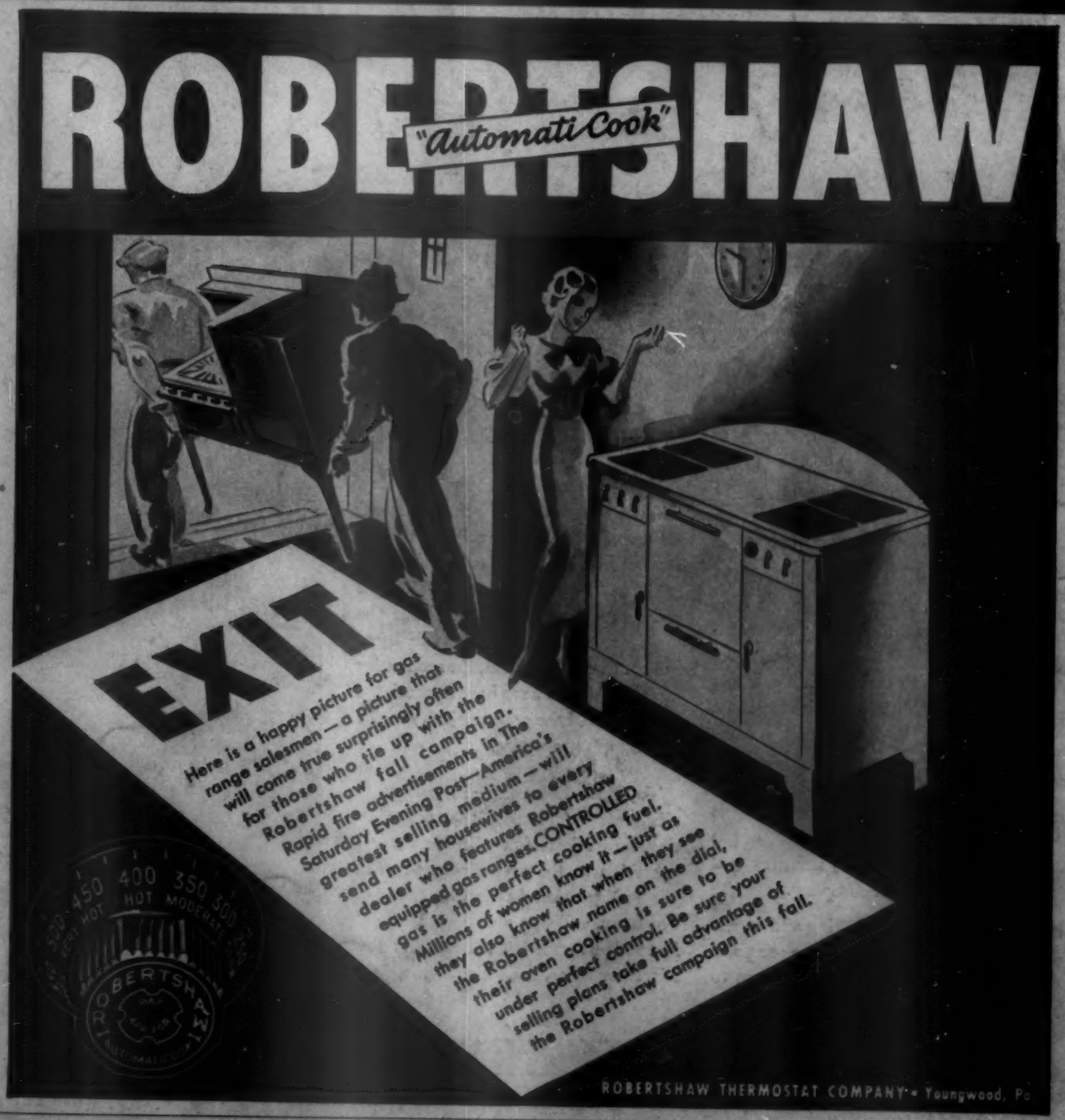
l. 141, No. 4 October, 1934 Price 25c

AMERICAN GAS JOURNAL

OCT -4 193


ROBERTSHAW
"Automati-Cook"
EXIT
Here is a happy picture for gas range salesmen—a picture that will come true surprisingly often for those who tie up with the Robertshaw fall campaign. Rapid fire advertisements in The Saturday Evening Post—America's greatest selling medium—will send many housewives to every dealer who features Robertshaw equipped gas ranges. CONTROLLED gas is the perfect cooking fuel. Millions of women know it—just as they also know that when they see the Robertshaw name on the dial, their oven cooking is sure to be under perfect control. Be sure your selling plans take full advantage of the Robertshaw campaign this fall.
ROBERTSHAW THERMOSTAT COMPANY • Youngwood, Pa.

During the past 12 months

2 MILLION MCF

were added to the annual national load by the sale of

ELECTROLUX!

Did you get your share of this valuable increase?

Thanks to splendid cooperation of the gas industry, the past year has seen thousands more Gas Refrigerators installed on the lines throughout the country. This has meant an important permanent addition to the national load—greater, in fact, than the combined yearly consumption of 4 cities the size of Savannah. Yet this load increase—valuable as it is of itself—is but part of the real importance of gas refrigeration to the gas industry and to every individual company.

For, today, in the trying and uncertain times through which we are passing, one thing of vital consequence to every utility in the country is the *good will* of its customers. To maintain and augment this, means keeping the public sold on the service which it receives. The opportunities which gas refrigeration affords to publicize the greater usefulness and dependability of gas . . . to publicize, too, the modernity of gas as fuel . . . have been appreciated by officials of the great majority of the leading gas properties.

To these companies—as well as to all other companies—the manufacturers of Electrolux offer fullest cooperation in the active promotion of gas refrigeration in their territories. For merchandising and sales help, get in touch at once with Electrolux Refrigerator Sales, Inc., Evansville, Ind.

AMERICAN GAS JOURNAL, October, 1934, Vol. 141, No. 4. Published monthly by American Gas Journal, Inc., at 34 N. Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 53 Park Place, New York, N. Y. Entered as second class matter, October 17, 1928, at the post office of East Stroudsburg, Pa., under the Act of March 3, 1879.

AMERICAN GAS JOURNAL

Established 1859

OCTOBER 1934

Contents

	Page
Editorial Comments	7
Gas Uses in Cylindrical Roller Bearing Factory—Ralph Manier	9
Summer Air Conditioning With Gas—W. S. Walker	11
Window Displays Can Be Effective—Yet Inexpensive	13
Comparative Fuel Consumption Tests—Dorothy E. Shank	14
High Pressure Storage	18
Technical Digest	22
The Gas Meter and Its Maintenance—John E. Godsoe	23
Operation Losses of Coal Carbonizing Equipment—Glenn H. Niles	25
Sulfur Problems in Gas Making	27
Eliminating Nitric Acid From Revivified Sponge—G. E. Seil, H. A. Heiligman and Allen Crabill	28
Sell One Thing At a Time in Your Window Displays—Stuart Bratesman	29
"Come Into the Kitchen" Theme of Attractive Display	30
Idea of a Successful Sales Manager—John T. Bartlett	31
Sales Slants	32
What the A. G. A. 16th Annual Convention and Exhibit Means to Every Gas Man	34
Exhibitors At A. G. A. Convention	37
Equipment News	40
News of the Gas Industry	42
Personals	44
Trade News	48

PUBLISHED MONTHLY BY
AMERICAN GAS JOURNAL, Inc.
53 Park Place, New York

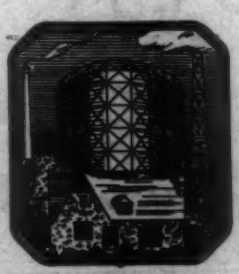
S. G. KRAKE, *Publisher*
A. M. GLEASON, *Secretary*

ADVERTISING REPRESENTATIVES:
R. H. PIERCE, *53 Park Place, New York;* THOMAS MORGAN, *168 N. Michigan Ave., Chicago, Ill.;* HARLEY R. MANKIN, *9906 Theodore Ave., N.W., Cleveland, Ohio;* NORMAN C. NOURSE, *681 Market St., San Francisco, Cal.*

Subscription $2.00 per year U. S. A.; $4.00 Canada; $4.00 Foreign. Single copies 25 cts.

VOLUME 141. NUMBER 4

WHOLE NUMBER 3730



DELEGATES AMERICAN GAS ASSOCIATION

WELCOME

SPECIAL RATES AMERICAN & EUROPEAN PLAN

EUROPEAN PLAN

Single Room with Bath (1 person) $3 to $5
Double Room with Bath (2 persons) $6 to $9

AMERICAN PLAN (With Meals)

$3.00 per person per day additional

A-la-Carte Menu in European Dining Room & Grill

"Just 5 Short Blocks on the Boardwalk from Municipal Auditorium"

HOTEL CHELSEA
ATLANTIC CITY

Under personal direction of

JOEL HILLMAN **J. C. MYERS** **JULIAN A. HILLMAN**

"WE ORDER EVERYTHING FOR PIPE LINE WELDING FROM LINDE"

Everywhere . . . . .

they're Lindewelding

UP in Wyoming, an 8-in. gas line was Lindewelded in weather well below freezing. A Linde Service man helped train the welders in the latest Lindewelding technique, further reducing time per weld by 15 per cent.

In sunny California, 40 miles of 26-in. pipe was Lindewelded. Through broiling heat Linde Service Operators followed every phase of the work to high speed records with each welder making over 20 welds per day.

Winter or summer, Lindewelded pipe lines continue to lead. Lindewelding speed—doubling or tripling the daily production of sound welded joints—helps offset weather delays or obstacles which cannot be avoided. The wide experience of Linde Service men in planning pipe line welding operations helps with short-cuts to overcome right-of-way difficulties due to hilly or swampy ground, or to creek, bayou or river crossings. *Linde Process Service* is your means of having pipe lines constructed under any conditions with speed, dependability and profit.

Linde Process Service is supplied without charge to Linde customers. The features and savings it affords explain why so many pipe line companies buy *Everything for Pipe Line Welding from Linde.*

Information on the latest developments in Lindewelding is yours for the asking. The nearest Linde Sales Office has data and figures to show how Lindewelding has been profitably used on pipe lines in your own vicinity. Call, write or telephone and this helpful information will be furnished you without obligation.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

126 Producing Plants · 859 Warehouse Stocks

IN CANADA, DOMINION OXYGEN CO., LTD., TORONTO

Sales Offices:

Atlanta	Houston	Portland, Ore.
Baltimore	Indianapolis	St. Louis
Birmingham	Kansas City	Salt Lake City
Boston	Los Angeles	San Francisco
Buffalo	Memphis	Seattle
Butte	Milwaukee	Spokane
Chicago	Minneapolis	Tulsa
Cleveland	New Orleans	
Dallas	New York	
Denver	Philadelphia	
Detroit	Phoenix	
El Paso	Pittsburgh	

LINDE OXYGEN · PREST-O-LITE ACETYLENE · OXWELD APPARATUS AND SUPPLIES · UNION CARBIDE

A WORTHY PRODUCT INHERITS A WORTHY TRADITION

The makers of American-Bosch products have always taken pride in creating, designing, building and selling products superior to those commonly in use. Proven leaders in their fields, these products are built up to a high standard of quality and not down to a price.

This creed, for many years a standard in the automotive field, now acquires significance for the entire gas industry.

For after a thorough investigation which produced an impressive demonstration of its merits, the Kompak Automatic Gas Water Heater, together with the famous Kompak organization, has been acquired by the United American Bosch Corporation.

Already the exceptional resources of American-Bosch . . . in engineering . . . in research . . . and in manufacturing . . . are being exercised, to continue the strides which Kompak has already made in the water heating industry.

If you are confronted with any water heating problems, our competent staff of engineers is at your service.

AMERICAN - BOSCH

KOMPAK

GAS APPLIANCE DIVISION

UNITED AMERICAN BOSCH CORPORATION

SPRINGFIELD, MASSACHUSETTS

New York Chicago Boston Pittsburgh

NRA CODE

Listen In: American-Bosch Radio Explorers Club every Sunday afternoon, WJZ-NBC.

EDITORIAL COMMENTS

GOOD NEWS was the unwritten caption above the recent release from FHA headquarters in Washington . . . meaning, the one which read: ". . . any equipment that is connected with gas piping may be included in loans insured by the Federal Housing Administration."

A few months ago we had been led to believe that this ruling was a part of the original plan. And, sensing that here was a grand opportunity for sales exploitation on the part of the entire Industry, we urged, in our August issue, that all gas companies cooperate to the fullest extent with the government's modernization program.

Then, the second week in August, coincident with the opening of the New York Regional Director's office, we were greatly surprised upon learning that only equipment and appliances, which became an integral part of the house, could be included as basis for loans . . . That word, ***integral,*** of course precluded all types of appliances such as ranges, refrigerators and heaters.

We first voiced our objection to this absurd discrimination in a letter to the FHA . . . Advising manufacturers and gas companies of the situation, we urged them to protest too . . . And, judging by the mail, they did . . . LONG and LOUD . . .

In the meantime, W. C. Berghorn of AGA, beseiged with wires, telephone calls and letters, was busy on the job, endeavoring to get a satisfactory official answer from Washington regarding the status of ALL gas appliances in reference to loans . . . The rest is ancient history. The quote in the opening paragraph is from the letter Mr. Berghorn received on September 7th . . . for which, three good old-fashioned HURRAYS . . .

THE NEXT STEP is to see just how many manufacturers and gas companies take advantage of this favorable ruling. We hope to be able to relay a lot of such activity in our November issue. At the moment, we just received a folder entitled. "What You Can Do With Your Home Repair Loan," prepared by Brooklyn Borough Gas Company . . . It's a timely and well-conceived piece of mailing matter . . . Let's hear what **YOU** are doing to capitalize upon this opportunity.

IN THIS ISSUE you will find news of next month's AGA Convention in Atlantic City . . . It looks great on paper; and everybody we know is looking forward to a big week at the Nation's Playground.

We are all aware that an array of improvements have invaded the manufacture of all gas appliances and equipment during the past three years.

The displays of Domestic Appliances without a doubt will generate a great feeling of pride in our Industry . . . And, in our enthusiasm for them, let's not overlook the exhibits of modern Plant and Distribution Equipment.

We all know that gas production must precede utilization. Hence, it is obvious that plant generating and distribution equipment should be in good condition before any new load-building campaigns are attempted . . . Surely inadequate service is the first pitfall to avoid in promoting any gas selling plan.

Due to very low demand lately for new installations, many innovations in the construction of heavy equipment have received but passing notice. The Atlantic City Show will present facts on the practical application of these new improvements and economies resulting from their use.

A PREVUE OF the plans for the Convention convinces us that those responsible for arrangements have done a fine job in building a general program of diversified interest . . . Meetings have been scheduled so that plenty of time will be available in which to see and study the booth attractions . . . Also, a fine balance has been maintained between educational and entertainment features.

As a parting shot, here's a suggestion: Let's go to the Convention with the thought that we're just ***holders*** designed to store up therms of the enthusiasm we'll feel so keenly while there. Then we can come back home with the knowledge of the most up-to-date equipment for the plant, and a fund of useful information for appliance sales.

HERE'S AN ITEM pregnant with red corpuscles for grey matter: In New York City's first city wide real property inventory, consisting of a canvass of each home in the five boroughs, the Housing Authority enumerators submitted reports showing that nine out of every ten Manhattan apartments with MECHANICAL REFRIGERATION were tenanted. More specifically, 90.5 per cent of the total 158,753 dwellings with mechanical refrigeration were rented. This figure contrasts sharply with a general occupancy ratio of 82.3 per cent for all family quarters.

HERE'S ONE SURE WAY GAS COMPANIES CAN *Save Money!*

Standardize on NATIONAL Scale Free Pipe for service lines! This will eliminate frequent interruptions on account of repairs and replacements, due to clogged orifices, or to pitting. The clean, smooth surfaces of this pipe have no scale to break off and start these troubles because the NATIONAL Scale Free Process (applied to butt-weld sizes ½ to 3-inch) eliminates the scale. This process was developed by National Tube Company and has made NATIONAL the outstanding pipe value for gas service. Read the 5 outstanding advantages listed to the left; they sum up the reasons why this pipe gives assurance of longer life, better service, and greater economy. For your next requirements be economical—play safe at the start—insist on NATIONAL—*The Original Scale Free Pipe.*

ADVANTAGES

1. Minimized corrosion—particularly pitting. 2. Better base for galvanizing or other protective coatings. 3. Full delivery capacity—less friction loss. 4. No damage to valve seats; no clogging of small orifices. 5. Greater strength at the weld —due to the extra rolling in the process.

All National Galvanized Pipe is given a special chromate treatment to resist discoloration and the formation of white rust. This patented process preserves that smooth glistening surface or metallic lustre which is characteristic of good galvanizing.

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

NATIONAL SCALE FREE PIPE
SPELLERIZED

AMERICAN GAS JOURNAL
October, 1934

Gas Uses in Cylindrical Roller Bearing Factory

By

RALPH MANIER

Industrial Heat Engineer,
The Syracuse Lighting Co., Inc., Syracuse, N. Y.

Hardening Furnaces

THE Railway Roller Bearing Co. was probably the first American manufacturer of roller bearings to specialize on railway and heavy industrial applications. The company was organized in 1907 for this purpose, and many of their original bearings are still in service. The company was reorganized as the Rollway Bearing Co. in 1922 for the manufacture of automotive and industrial bearings and has kept well in the lead in scientific development, both in design and application of bearing and in manufacturing methods.

This company manufactures roller bearings which find use in such applications as automobiles, airplanes, cranes, electric motors, paper machinery, rolling mills, etc. It is not difficult to imagine the severe uses to which these bearings are subjected.

The bearing itself consists of an inner and outer race together with multiple rollers which in some types are carried in a steel or a bronze retainer. The metals used for the races and rollers are alloy steels, SAE-52100, or in some instances a modification of this alloy. All of the incoming material is carefully inspected and tested. It is analyzed chemically to insure that it meets specifications and examined under the microscope for non-metallics, grain size and carbide distribution and size.

The parts are machined to close tolerances and heat treated after which they are ground to a high finish and to very accurate dimensions. Since the life and satisfactory use of the bearing depends upon the proper heat treatment of the parts, careful study has been given to this phase of the business. The heat treatments consist of normalizing, annealing, hardening and drawing.

Selection of Fuel

The selection of fuel began in the early days with the use of coal for heat treatment. At that time the bearings were made for railways and heavy industrial applications and were mostly case hardening parts. Later when they went to alloy steels the heat treating work was jobbed out to commercial heat treating people, but this was not found satisfactory as they could not give the close control which they desired over their product. The commercial heat treater was using oil furnaces which produced both decarburization and undesirable surface scaling. At that time the company decided to again do its own heat treating and investigated various sources of heat. It was finally decided that they would try gas as they felt that the gas would give them the desired results, and that it would be considerably cheaper than electricity for the purpose. The first determinations were made on a furnace converted to gas with low pressure one valve control, and with gas at $1.13 per thousand for 537 B.t.u. gas. The atmosphere in this furnace was set slightly on the oxidizing side by means of an Orsat. The results were so satisfactory that all of their heat treatment has been since done with gas, and oil has been entirely displaced. As the plant had grown and increased its gas consumption its earning power has increased, and also the trend of the gas rate has been downward so that the rate of 10.5c per therm is now enjoyed.

At present all of their gas furnaces are equipped with high pressure one valve control with Surface Combustion inspirators, and the gas is compressed with a Sullivan gas compressor. On furnaces which require an extreme range of temperature control, two stage Surface Com-

bustion burners are used. Batch type furnaces are used for heat treating the larger members. These will run from 2" diameter by ⅛" thick, up to 60" diameter by 2" thick. The size of the rollers range from 1/16" diameter by ⅜" long, to 3½" diameter by 6" long. The small parts are hardened in a continuous rotary American Gas hardening furnace with automatic quench. The tool room equipment consists of high speed steel furnace, preheating furnace, carbon tool furnace, cyanide furnace and salt bath.

This manufacturer has investigated the possibility of replacing fire brick lining with combination insulating refractory brick. The first furnace showed that the thermal capacity had so been reduced that it required only one-third of the time to reach balanced operating temperature conditions from a cold start, and that only one-half of the input was required to maintain this temperature. As a result the other furnaces are being changed over to similar linings as quickly as is possible while maintaining production.

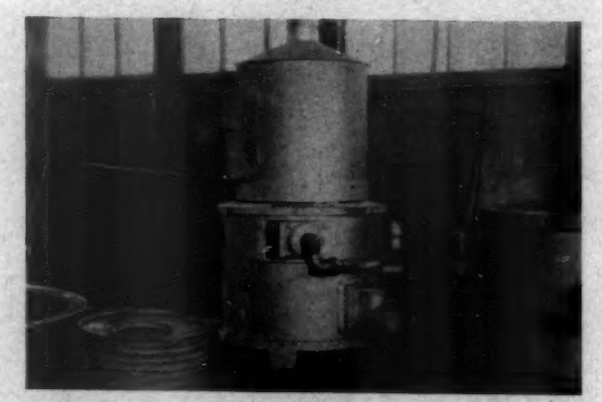
The heat treatments of the alloy steels cover the following temperatures: 1470 to 1540° F. is used in the case of bearings made to operate at normal temperatures and conditions, and up to 2150° F. for bearings to operate at high temperature or under corrosive conditions.

Due to the chromium content in this steel it is necessary to hold the parts at temperature for quite a length of time in order to put the carbide in solution. Due to this fact surface reactions have to be watched very carefully as time and temperature are determining factors in the amounts of damage done. The furnace atmospheres are, therefore, held to as close limits as possible. With this end in view periodic checks of the flue gas analyses are made with an Orsat apparatus, and a slightly oxidizing atmosphere is maintained. It is found that the analyses which give the best results with the given alloys at the temperatures used are:

CO_2	10½ to 11%
O_2	0.8 to 0.4
CO	0.0

It is necessary to preheat all of the races and larger size rollers to 900 degrees before placing them in the high temperature furnaces. It is interesting to note that if the atmosphere in the preheating furnaces is not proper a slight film is formed on the surface of the work which appears to act as a catalyzer when the steel is transferred to the high temperature furnace with the result that the steel will not properly harden. This has been checked numerous times with steels from the same heat, as it was not thought that damage would be expected at such low temperatures as 900 degrees.

Realizing that unless the heated steel is properly quenched after hardening, this company has gone further than most others in the care of their quenching medium. The quenching oil is pumped from the storage tank through a heat exchanger and circulated through the quenching baths. This heat exchanger has thermostatic control on the water by means of a Sylphon valve which insures that the oil does not go beyond 130° F., while thermostatically controlled gas boiler circulates the hot water through the heat exchanger in order to assure that the oil at no time is below 90° F. when used for quenching purposes, as any temperatures below that point are too drastic for the steels in question.



Cyanide Baths and Salt

Some interesting sidelights of gas use at this plant are the heating of washing machines for cleaning metal parts, and also the use of a unit heater for heating their offices.

This company has learned by experience that gas offers the best and most economical tool for producing the high quality product which they make.

Small Rotary Hardening Furnace

Gas—The Modern Fuel For Industry

Another New Jersey newspaper has gone modern. The Jersey Journal, published in Jersey City, recently installed submerged gas hot tubes for melting the tons of stereotype metal required for their various editions. Speed and efficiency were the results expected and they have, of course, been accomplished.

But the installation also brought a monthly saving of almost sixty percent in this operation. That is an economy that will continue after the cost of the new equipment has been saved. It is another proof of the efficiency and unique ability of gas.

Another boost for gas heat comes from a manufacturer of dolls in Trenton. The company had fifty-nine pressers for performing the many different operations needed in making dolls but the heat being used would not maintain the exact constant temperatures required because of the unevenness of combustion.

An industrial gas expert from the local gas company was called in and recommended certain gas mixing and burning equipment. The changes were made and it was found that proper combustion and exact temperatures were attained. There are no more interruptions in production and the cost of fuel is lower.—New Jersey Public Utility Information Committee.

Summer Air Conditioning With Gas

W. S. WALKER*

Consolidated Gas Co. of New York

Central Plant Air Conditioner Installation, Jamaica, N. Y.

IT IS now essential that the management of every gas company give serious consideration to a policy concerning the promotion of summer air conditioning equipment. Although this new use for gas must still be considered in the development stage, with the ultimate in performance of equipment still to be attained, it has, during the summer of 1934, definitely become a commercial factor in the Industry. Some fourteen comfort conditioning installations, in addition to industrial installations, have been made during the years 1930 to 1933, inclusive, principally under the auspices of the American Gas Association Committee on Industrial Gas Research, which sponsored the development of apparatus as it stands today. In addition, there have been a number of large installations having an equivalent tonnage of 50 to 200 per day, the gas consumption in some cases being as high as 4000 cubic feet per hour.

These installations have and are giving an excellent account of themselves. As a direct result, a gas appliance manufacturer of national standing and wide experience in the manufacture and distribution of heating and winter air-conditioning equipment has taken up the project and is making the latest type Silica Gel central conditioners available through its sales outlets. That company, directly under the sponsorship of the Committee on Industrial Gas Research, has also developed a small unit utilizing the same principle for conditioning single rooms. While lasting success now seems virtually assured, the rate of development and acceptance of this equipment will depend entirely upon the impetus given to it by the industry in making installations.

For purposes of consideration, gas summer air conditioning may be divided into three parts: first is single-room conditioning which is done with the cabinet unit; next is the small central installation representative of residences, small tea rooms, and shops, and third, there would be the large central commercial installations. Equipment is available for all of these applications and, while it is generally acknowledged that the proper sale and installation will not be an easy matter during the early pioneering stages, the added effort should prove to be decidedly worth while. It should also be mentioned that a program for starting the promotion of this business should not be limited to a single phase of it even

Harmony Tavern, Jamaica, N. Y. Air Conditioned By Gas

**Chairman of Sub-Committee on Summer Air Conditioning of A.G.A. House Heating Committee.*

at the beginning, but it should include the sale of the largest installations involving two thousand cubic feet of gas per hour or more as well as the small cabinet units.

The Need for Air Conditioning

No one would question the potential value of summer air-conditioning to the gas industry. As an adjunct to the central heating plant, it will bring about an increased number of customers, especially in the finer homes, where summer conditioning will be demanded. In such homes gas-heating has not always been looked upon with particular favor because the heating plant is attended by a servant who could not be dispensed with even though automatic gas heat is installed. Summer air-conditioning in restaurants will be of great assistance in holding this load against competitors using low-grade fuels, because it adds to the use of gas in applications which cannot be converted to these other fuels and thus reduces the percentage of the total load which will be vulnerable to competitors.

No single line of activity could bring about greater security to the house-heating and restaurant load than an aggressive promotion of summer air-conditioning. It will help to hold the present business and assist in getting new customers because it will enable this one form of energy to perform a wider range of services in a better manner than any other obtainable. The large market for summer air-conditioning makes it a real potential factor in increased sendout and one which is ideal for improving the seasonal load factor. Further, its success is sure to be accompanied by enhanced good will, in that it will bring gas to the fore as the modern form of energy.

The New Equipment

The new Unit Summer Conditioner is equally as good in appearance as competitive machines and its construction is simple and durable. It deserves to be ranked with all finer gas appliances. Mechanically, it consists essentially of a circulating fan to move 750 c.f.m., an activation and adsorption fan to force 75 c.f.m. through the gel beds, a 1/6-hp. motor which runs both fans, a water cooler of the extended-surface type, and a gas burner. While the machine is conditioning, air is forced through the gel beds, where it is dehumidified. Then it is drawn into the circulation fan, where it mixes with fresh air from the outside and recirculated air; next, the mixture is blown through the cooler, from which it mixes with the air in the room. After the unit has operated 8 or 10 hours, the gel beds must be reactivated. This is accomplished by a suitable mechanism which ignites the gas burner and shifts a damper, allowing the moisture to be driven out of the gel and through a duct leading to the outside of the building. A small red signal light automatically goes on during this period. During activation, cooling and circulation are continued.

Indicating Thermometer and Relative Humidity Instrument

The quantity of water used will depend on its temperature and the amount of cooling desired. The maximum water consumption is 300 gallons per hour, but the average has been estimated at considerably less, say about one-half this amount. The capacity of the cooler varies from 0.5 to 1.2 tons of equivalent refrigeration as the difference between incoming water and air temperature increases from 8 to 20 degrees, and it will bring the outgoing air temperature to within 5 degrees of the incoming water temperature. The heat input is 20,000 B.t.u. per hour for 3½ hours to expel the 10 pounds of water vapor adsorbed during the 8 hours of useful life of the gel during each cycle.

The central plant condition, except for minor changes, is the same as those which have been described in various publications in connection with installations made by the Industrial Gas Research Committee. However, the design is being matched with a warm-air-heating unit to make the maximum use of the various elements such as fans and filters which are used on both of the two units.

Training Personnel

The technical aspects of summer air-conditioning are admittedly very complicated, probably more so than any other phase of domestic gas utilization. Estimating requirements and other phases of this work can not yet be dealt with in the exact manner that house heating can. Properly laying out systems and rectifying difficulties which may arise require specific technical training. This being true, each utility company should plan to have this technical knowledge available. Otherwise delays in getting started are certain to occur. As a first step, one or more men should be assigned the responsibility of this work. Although the immediate possibilities of installations might not seem to justify this action, any company which does not provide it will be seriously handicapped. The necessary information may be obtained through extension courses, current articles, hand books on the subject, and from the manufacturer. The importance of becoming thoroughly familiar with the use of the different psychometric charts will be difficult to over-emphasize. From one key man the amount of information required may be spread throughout the Company to sales and service representatives to whom it will be a benefit.

An excellent means of encouraging salesmen and engineers to think correctly in air conditioning terms is to provide them with an indicating temperature and relative humidity instrument. This instrument in slightly varying forms can be had from several different manufacturers. The cost, which is slight, is easily offset by its value in educating those who are interested in air conditioning, regarding the true effect of varying degrees of humidity and temperature upon comfort. Some utilities have placed one of these instruments on the desk of each salesman and engineer concerned with this work.

Cost of Installation

It is very difficult to make a comparison between the Silica-Gel Gas Unit Conditioner and the Electric Unit Conditioners, either with respect to performance or to price. This is because the basic principle of operation is different, and in localities where high humidity prevails and relatively cool tapped water is available, the Unit Silica-Gel Conditioner would have greater capacity for producing comfort than a 1½ ton Electric Unit. Under conditions less favorable, it would have nowhere near this capacity.

The list price has been established for the Unit Conditioner at $650.00. One make of Electric Unit having a

rating of from ½ to ¾ tons lists at $400.00. A second make of 1-ton capacity lists at $500.00, the third 1-ton Unit at $550.00 and a fourth 1½ tons capacity lists at $800.00. The cost of making the installation must be added to all of these figures. This indicates that where conditions are favorable to the Gas Unit, it compares favorably with competitive equipment from a price standpoint. However, there may be the natural resistance on the part of the customer to buying a new and relatively untried piece of equipment, and it would appear to be a wise policy to make price reductions where necessary in getting the first units into service in each locality. The loss to be taken in making installations in this manner may very well be justified as a development expense, and it certainly should be returned to the Industry many times in the form of increased business resulting from air conditioning. A comparison of the Gas Unit with any one of the competitive Electric types will show without question that the price of the Gas Unit can be made appreciably lower than the competitor when equal quantities are manufactured.

Central plant Silica Gel Conditioners appear to be considerably more favorable from the price viewpoint than the unit conditioner, especially when used in conjunction with winter conditioning. Furthermore, the competition is not nearly so firmly established.

There are certain limitations to both of the new types of conditioners and for this reason discretion must be used in placing them. There are so many variations to be encountered that no attempt will be made here to outline a set of conditions under which unsatisfactory results would be realized. However, when normal summer tap water temperature is 74° or less, the Room Conditioner will do a good job in a room having 3000 cubic feet of space provided it is of reasonably tight construction and would ordinarily not have more than one air change per hour. Where infiltration seems excessive, weather stripping of doors and windows will be advantageous. Generally speaking, then, it may be said that the best locations would be Doctors' and Dentists' offices, very small shops, rooms in private houses, and executives offices, *especially those in the Gas Company building.*

One of the most promising applications for the central conditioner is in medium sized restaurants. Here the moisture released from foods contributes in a large part to the discomfort, and the drying principle will be particularly effective. One of the central plant installations installed at Jamaica, L. I., conditions a restaurant with 2,475 square feet of floor space and a seating capacity of 150. It is one of the most satisfactory yet put into operation.

The Steam Ejector

The steam ejector principle of summer air conditioning has been described very completely in reports issued by the Committee on House Heating and Air Conditioning during the previous four years, and it will only be mentioned here that this method of summer air conditioning has definitely proven its dependability in conditioning systems of fifty tons or more refrigerating capacity. Some of the largest air conditioning installations now operating have employed the steam ejector principle using district steam, and these have been eminently satisfactory. Gas is readily applicable to this method of air conditioning, where natural gas is available at low rates for steam generation.

The application of this principle to small installations involving less than fifteen tons of refrigerating capacity, and having an integral gas-fired boiler, is in the development stage, and much is being learned through observation of two installations, one of which is in New York and one in Kansas City.

It is evident that the time for action with respect to air conditioning has arrived. It has suddenly taken on a commercial status, and while there has been considerable information collected on the subject, there is still relatively little known and a vast amount to be gained. On account of this lack of knowledge and the limitations of present equipment, the industry can not look forward to a large number of installations this year. However, each Gas Company should arrange for at least one installation in its territory. With the amount of knowledge which can be gained from such a beginning, and with the improvement and reduction in price which are certain to follow the acceptance of gas summer air conditioning, it is bound to grow to be a real factor in the gas industry.

WINDOW DISPLAY CAN BE EFFECTIVE—YET INEXPENSIVE

As twenty-five percent of the Appliance sales of the Delaware Power and Light Co., Wilmington, Del. are made through the sales floor, Lloyd R. Leslie, commercial sales manager of the company, gives considerable credit to the sales appeal of their window display.

These displays are prepared and arranged by a sales floor representative on a part time basis at an approximate cost of ten dollars each.

Ice Cubes Tell the Story of the Advantages of Gas Refrigeration

Announcing Reduction of Gas Rate for Househeating in Window Display

Comparative Fuel Consumption Tests

Dorothy E. Shank
Director Research Kitchen
AMERICAN STOVE COMPANY

Whole Meals

The following are meals for four or five persons, depending on appetites; likes and dislikes, accessories to meal that require no cooking, i.e., appetizers, relishes, salads, etc. All the recipes, except those for which amounts of material that had to be heated on the stove are given, were taken from Magic Chef Cooking cook book.

	Total Natural Gas Consumption		Total Electricity Consumption	
	Cu. Ft.	Btu.	Kw-hr.	Btu.
DAY I				
BREAKFAST: Poached Egg, Oven Cooked Bacon, Muffins, Drip Coffee	12.09	12609.87	1.88	6414.56
LUNCH: Macaroni and Cheese, Lettuce Salad, Baked Apples, Coffee	22.68	23655.24	2.31	7881.72
DINNER: Baked Pork Chops, Candied Sweet Potatoes, Buttered Cauliflower, Peach Cobbler, Coffee	20.97	21871.71	3.30	11259.60
Day's Totals	55.74	58136.82	7.49	25555.88
Sunshine Cake baked between lunch and dinner..	10.26	10701.18	.79	2695.48
DAY II				
BREAKFAST: Oven Cooked Bacon, Oven Fried Eggs *, Baking Powder Biscuits, Coffee	10.59	11045.37	1.42	4845.04
LUNCH: Stuffed Peppers, Rolls (Reheated), Apple Turnovers (1½ cups pastry flour—6 apples), Coffee	20.45	21329.35	2.56	8734.72
DINNER: Baked Cottage Ham, Potato Balls en Casserole, Onions, Apricot and Rice Pudding, Apricot Sauce, Coffee	30.49	31801.07	3.04	10372.48
Day's Totals	61.53	64175.79	7.02	23952.24
DAY III				
BREAKFAST: Oatmeal, Fruit, Popovers, Coffee	18.99	19806.57	2.43	8291.16
LUNCH: Creamed Mushrooms on Toast (1½ cups milk), Lettuce Salad, Apple Scallop, Coffee	17.90	18669.70	1.79	6107.48
DINNER: Swiss Steak—Carrots, Potatoes, Beans (3 lbs. meat), Raspberry Pie (baked in morning), Coffee	17.05	17783.15	2.50	8530.
Day's Totals	53.94	56259.42	6.72	22928.64
Raspberry Pie baked between lunch and dinner..	9.67	10085.81	1.31	4469.72

* Oven Fried Eggs (Recipe taken from General Electric Cook Book). Place 9 slices of bacon on a rack in a shallow pan and place in a 450 degrees oven for 7 minutes. Remove the bacon from the pan and pour most of the fat from the pan. Put 6 eggs in hot bacon pan and place in oven for 6 minutes with the oven turned off.

COMPARATIVE fuel consumption tests were carried out in the Research Kitchen of American Stove Company using a No. A-640-N Clock controlled Magic Chef Gas Range and a General Electric clock controlled range of the Lenox RA-59 Model. The tables herewith summarize some of the results obtained from these tests.

In every instance identical ingredients—in kind and amounts; pans; recipes and methods of preparing were used. When the oven was used the regulator was set for the same temperature in each oven. It was impossible to regulate the temperature of the room, pans or food from day to day for if the room became warmer during the day naturally the ovens, pans and food also became warmer. Therefore, some days it required more fuel to preheat each oven than other days or at other periods during the same day. Likewise it took less heat to cook food if that food were warmer than at another time.

There are no scientific tests for doneness. Meat was roasted to a given internal temperature, which is the most definite test for doneness that could be employed. For other prodcuts it was necessary to depend on certain arbitrary tests and standards set by the Research Kitchen. The aim was to make these tests of a practical rather than strictly scientific nature but to standardize procedures as far as possible without complicated and scientific devices.

When vegetable tests were made using the so-called waterless method the pans were fitted with tight fitting covers. When cooked in sufficient water to cover, covers were not used on all vegetables. Strong flavored vegetables are usually cooked uncovered and some vegetables discolor less if cooked without covers

on the pans. Vegetables differ from season to season as sometimes they are more dry than others depending on market conditions. They were kept on high heat until steam was formed, then turned to a low heat until tender, this tender stage being a variable.

For all surface cooking pans were used that completely covered the electric units to conserve fuel and, of course, duplicate pans were used on the gas range.

Sometimes tests were checked using different size pans for baking. Occasionally baking sheets were used for biscuits and cookies. At other times inverted smaller pans were used.

Sometimes double crust fruit pies were baked in glass and sometimes in aluminum.

Roast beef was always placed on a rack. The same cut was always secured from the two sides of the same animal and while the time for roasting differed somewhat each roast was roasted until the same internal temperature was reached.

In the preparation of whole meals different standards might be found for different degrees of browning and other factors. Recipes having different proportions of ingredients might also make considerable difference. It is realized that except in a very detailed report it is impossible to describe each method, each pan or give each recipe.

In every case when the preheating consumption was taken it was taken from a cold oven. In some instances when the ovens were in use for one test following directly after another it was not possible to get the data on preheating.

Natural gas was used and the Btu values figured using 1043 Btu per cu. ft. of natural gas for the average figure.

	Total Natural Gas Consumption		Total Electricity Consumption	
	Cu. Ft.	Btu.	Kw-hr.	Btu.
DAY IV				
BREAKFAST: Fruit, Creamed Chipped Beef (1 lb. beef, 2 cups sauce), Coffee	6.37	6643.91	.93	3173.16
LUNCH: Vegetable Plate (Carrots, beans, lettuce salad), Cake, Chocolate Sauce, Coffee	9.81	10231.83	1.31	4469.72
DINNER: Veal Birds, Mashed Potatoes, Spinach, Salad, Vanilla Custard (1½ pts. milk), Coffee	9.58	9991.94	1.62	5527.44
Day's Totals	25.76	26867.68	3.86	13170.32
DAY V				
BREAKFAST: Cereal, Pan Broiled Bacon, Coffee	4.55	4745.65	.77	2627.24
LUNCH: Cream of Tomato Soup, Salad, Tapioca Cream, Coffee	7.88	8218.84	.96	3275.52
DINNER: Scalloped Potatoes and Ham, Cauliflower, Peach Cobbler, Coffee	14.09	14695.87	2.44	8325.28
Day's Totals	26.52	27660.36	4.17	14228.04
DAY VI				
BREAKFAST: Bacon, Eggs, Toast, Coffee	6.50	6779.50	.94	3207.28
LUNCH: Cream of Tomato Soup, Toasted Cheese Sandwiches, Peach Gelatin Cream (¼ cup water), Cookies, Coffee	9.98	10409.14	1.03	3514.36
DINNER: Scalloped Potatoes, Beef Loaf, Buttered Carrots, Steamed Chocolate Pudding, Chocolate Sauce, Coffee	21.17	22080.31	2.67	9110.04
Day's Totals	37.65	39268.95	4.64	15831.68
DAY VII				
BREAKFAST: Fruit, Griddle Cakes, Coffee	6.91	7207.13	1.03	3514.36
LUNCH: Creamed Asparagus on Toast (2 lbs. asparagus, 2 qts. water, 2 cups sauce), Fruit, Cookies, Coffee	11.57	12067.51	1.42	4845.04
DINNER: Roast Leg of Lamb, Parsley Potatoes, Buttered Green beans, Strawberry Chiffon Pie (¼ cup water to dissolve gelatin), Coffee	39.76	41469.68	3.66	12487.92
Day's Totals	58.24	60744.32	6.11	20847.32

TOTALS FOR WEEK'S MEALS

	Total Natural Gas Consumption		Total Electricity Consumption	
	Cu. Ft.	Btu.	Kw-hr.	Btu.
DAY I (inc. Sunshine Cake)	66.00	68838.00	8.28	28251.36
DAY II	61.53	64175.79	7.02	23952.24
DAY III (inc. Raspberry Pie)	63.61	66345.23	8.03	27398.36
DAY IV	25.76	26867.68	3.86	13170.32
DAY V	26.52	27660.36	4.17	14228.04
DAY VI	37.65	39268.95	4.64	15831.68
DAY VII	58.24	60744.32	6.11	20847.32
Week's Totals	339.31	353900.33	42.11	143679.32
AVERAGES:	48.472	50557.19	6.015	20525.617

Calculating the cost per day at an average of $.70 per M cu. ft. of natural gas and $.035 per kw-hr. of electricity it would cost $.0339 per day for natural gas and $.2105 for electricity to prepare exactly the same meals.

Roast Beef

Constant Factors: Meat used: Rolled and boned rib roasts.
Preheat Time and Temperature: 500 degrees for 20 min.
Pan used: Aluminum roaster with rack.
Searing Time and Temperature: 500 degrees for 20 min.
Roasting Temperature: 300 degrees.
Internal Temperature: 155 degrees F.

	MAGIC CHEF						GENERAL ELECTRIC					
Date	Weight	Time of Roasting	Preheat Cu. ft.	Roast Cu. ft.	Total Cu. ft.	Total Btu.	Loss	Preheat Kw-hr.	Roast Kw-hr.	Total Kw-hr.	Total Btu.	Loss
3-20-33	5 lbs.	2 hr. 40 min.	6.64	14.81	21.45	22372.25	20%	1.22	1.12	2.34	7984.08	20%
3-27-33	4 lb. 2 oz.	2 hr. 8 min.	6.37	20.18	27.18	28348.74	25%	1.13	.82	1.95	6653.40	25%
3-30-33	5½ lbs.	3 hours	6.17	23.94	30.11	31404.73	21.59%	1.04	1.15	2.19	7472.28	20.44%
					97.31	101486.33				6.48	22109.76	
		Averages:			32.436	33828.776				2.160	73699.20	

Vegetables

Constant Factors: 3 Tablespoons water used.
8-inch heavy aluminum pan used.
Pan covered.
Note: Brackets denote vegetables that were cooked together in one pan by the so-called waterless method.
Note: (w) or (c) after vegetables denotes whole or cut.

			MAGIC CHEF					GENERAL ELECTRIC				
Date	Kind	Amount	Burner High (Min.)	Burner Low (Min.)	Total Time (Min.)	Total Cu. ft.	Total Btu.	Burner High (Min.)	Burner Low (Min.)	Total Time (Min.)	Total Kw-hr.	Total Btu.
10- 5-33	Potatoes .....(w)	4 med.										
	Beans .....(c)	1 lb.	5	45	50	2.75	2868.25	5	45	50	.40	1364.80
	Carrots .....(c)	½ lb.										
10- 5-33	Potatoes .....(w)	5 med.										
	Beans .....(c)	¾ lb.										
	Onions .....(w)	3 med.	5	40	45	2.18	2273.74	5	40	45	.39	1330.68
	Carrots .....(c)	½ lb.										
10- 6-33	Potatoes .....(w)	5 med.										
	Beans .....(c)	¾ lb.										
	Cabbage .....(c)	½ lb.	5	40	45	2.22	2315.46	5	40	45	.37	1262.44
	Carrots .....(c)	½ lb.										
10- 8-33	Potatoes .....(c)	1½ lbs.										
	Beans .....(c)	1½ lbs.	5	35	40	1.72	1793.96	5½	35	40½	.21	716.52
10-18-33	Potatoes .....(c)	1½ lbs.										
	Carrots .....(c)	1½ lbs.	5	35	40	1.96	2044.28	5½	35	40½	.22	750.64
10-19-33	Carrots .....(c)	1½ lbs.										
	Onions .....(w)	1½ lbs.	5	40	45	1.97	2054.71	6	40	46	.24	818.88
10-19-33	Beans .....(c)	1½ lbs.										
	Cabbage .....(c)	1½ lbs.	5	38	43	1.99	2075.57	5½	38	43½	.23	784.76
10-19-33	Beans .....(c)	1 lb.										
	Potatoes .....(c)	1½ lbs.	5	35	40	1.98	2065.14	5½	35	40½	.27	921.24
	Carrots .....(c)	1 lb.										
10-19-33	Potatoes .....(c)	2 lbs.										
	Onions .....(w)	2 lbs.	5	50	55	2.22	2315.46	5½	50	55½	.31	1057.72
	Beans .....(c)	1 lb.										
10-20-33	Potatoes .....(c)	3 lbs.										
	Beans .....(c)	2 lbs.	5	75	80	2.46	2565.78	6	75	81	.35	1194.2
	Onions .....(w)	1 lb.										
10-20-33	Carrots .....(c)	2½ lbs.										
	Beans .....(c)	2½ lbs.	5	70	75	2.80	2920.40	5½	70	75½	.32	1091.84
	Cabbage .....(c)	1 lb.										

Vegetables

					MAGIC CHEF					GENERAL ELECTRIC				
Date	Kind	Amount	Cut or Whole	Water	Burner High (Min.)	Burner Low (Min.)	Total (Min.)	Total Cu. ft.	Total Btu.	Burner High (Min.)	Burner Low (Min.)	Total (Min.)	Total Kw-hr.	Total Btu.
10-12-33	Beans	1 lb.	1½" pieces	3 T	5	34	39	2.53	2638.79	5	38	43	.24	818.88
10-12-33	Beans	1 lb.	1½" pieces	2½ C	8	25	33	2.06	2148.58	10½	25	35½	.28	955.36
11-29-33	Beans	1 lb.	1" pieces	½ C	3	30	33	1.34	1397.62	5	30	35	.26	887.12
10-11-33	Carrots	1½ lbs.	Quarters	3 T	5	28	33	2.12	2211.16	5	28	33	.26	887.12
11-29-33	Carrots	1 lb.	Quarters	½ C	3½	31½	35	1.68	1752.24	5	30	35	.26	887.12
10-11-33	Carrots	1½ lbs.	Quarters	3 T	9	25	34	2.36	2461.48	12	25	37	.35	1194.2
10-23-33	B. Sprouts	1 pint	Whole	3 T	1½	18½	20	.99	1032.57	4	16	20	.15	511.80
10-23-33	B. Sprouts	1 pint	Whole	3 C	6	19	25	1.39	1449.77	8½	22	30½	.41	1398.92
11-28-33	Cauliflower	1½ lbs.	Broken	3 T	3	20	23	1.25	1323.75	5	20	25	.21	716.52
11-28-33	Cauliflower	1½ lbs.	Broken	½ C	3½	18	21½	1.26	1314.18	5	18	23	.19	648.28
10-13-33	Onions	1 lb.	Whole	3 T	5	50	55	2.51	2617.93	5	45	50	.34	1160.08
10-13-33	Onions	1 lb.	Whole	3 C	7	45	52	3.92	4088.56	12	40	52	.88	3002.56
10-23-33	Peas	2 cups	Shelled	3 T	2	13	15	.76	792.68	4½	13½	18	.18	614.16
11-29-33	Peas	2 cups	Shelled	½ C	3½	12½	16	1.1	1147.3	5	12½	17½	.15	511.80
10-23-33	Peas	2 cups	Shelled	1½ C	4¾	9½	14¼	1.35	1408.05	7½	9	16½	.18	614.16
11-28-33	Potatoes	1 lb.	Halves	½ C	3½	27	30½	1.40	1460.20	5	27	32	.24	818.88
11-27-33	Potatoes	1 lb.	Halves	3 T	3	23	26	1.2	1251.6	5	20	25	.18	614.16
11-27-33	Potatoes	1 lb.	Halves	5 T	3	28	31	1.23	1282.89	5	28	33	.26	887.12
10-17-33	Turnips	1 lb.	½" Cubes	3 T	3½	30	33½	1.7	1773.1	5	30	35	.22	750.64
10-17-33	Turnips	1 lb.	½" Cubes	2½ C	7½	28	35½	1.92	2002.56	10½	28	38½	.26	887.12

Vegetables

The following four tests were made using pans of different materials.
In each test 1 pound of small potatoes, cut in halves, were used.
In each test 3 tablespoons water were used.

			MAGIC CHEF					GENERAL ELECTRIC				
Date	Pan Size	Material	Burner High (Min.)	Burner Low (Min.)	Total Time (Min.)	Total Cu. ft.	Total Btu.	Burner High (Min.)	Burner Low (Min.)	Total Time (Min.)	Total Kw-hr.	Total Btu.
10-18-33	6½"	Enamel	3	25	28	2.01	2096.43	5	25	30	.21	716.52
10-18-33	7½"	Aluminum	3½	25	28½	2.08	3169.44	5	25	30	.22	750.64
10-18-33	6½"	Stainless Steel	3	25	28	1.93	2012.99	4½	25	29½	.21	716.52
10-18-33	5½"	Copper	2½	24	26½	1.83	1908.69	4	23	27	.20	682.4

Apple Pie

Constant Factors: Temperature: 425 degrees
Size of pan: 9-inch.

		MAGIC CHEF						GENERAL ELECTRIC					
			Preheat						Preheat				
Date	Pan Material	Time (Min.)	Time (Min.)	Cons. Cu. ft.	Bake Cu. ft.	Total Cu. ft.	Total Btu.	Time (Min.)	Time (Min.)	Cons. Kw.-hr.	Bake Kw.-hr.	Total Kw.-hr.	Total Btu.
4-12-33	Glass	40	16½	5.52	7.32	12.84	13392.12	40	16½	.9	.44	1.34	4572.08
4-12-33	Glass	40	17	6.10	6.58	12.68	13225.24	40	17	.77	.35	1.12	3821.44
4-13-33	Glass	40	17	5.35	6.95	12.30	12828.90	40	17	.87	.55	1.42	4845.04
6-26-33	Aluminum	35	15	4.98	6.46	11.44	11931.92	35	16	.64	.54	1.18	4026.16
7- 3-33	Aluminum	35	15	5.05	6.35	11.40	11890.20	35	16	.68	.54	1.22	4162.64
						60.66	63268.38					6.28	21427.36
	AVERAGES:					12.132	12653.676					1.256	4285.472

Baking Powder Biscuits

Constant Factors: Temperature: 475 degrees
Pans: 8-inch round tin
Biscuits: 5 on each inverted pan
Sheet: Light tin 10¾ x 15¾
Biscuits: 20 on each sheet
Total biscuits: 20 in the oven for each test.

		MAGIC CHEF						GENERAL ELECTRIC				
			Preheat					Preheat				
Date	Pan or Sheet (Number)	Time (Min.)	Time (Min.)	Cons. Cu. ft.	Bake Cu. ft.	Total Cu. ft.	Total Btu.	Time (Min.)	Cons. Kw.-hr.	Bake Kw.-hr.	Total Kw.-hr.	Total Btu.
1-25-33	4 pans	12		7.51	3.59	11.10	11577.3		.06	.26	1.32	4503.84
7- 3-33	4 pans	11½	17½	5.41	3.92	9.33	9731.19	19	.97	.30	1.27	4333.24
7- 3-33	4 pans	11½	17½	5.10	4.32	9.42	9825.06	18	1.0	.3	1.3	4435.6
7- 5-33	4 pans	11½	18	5.84	3.31	9.15	9543.45	18	.87	.34	1.21	4128.52
4-11-34	1 sheet	10½	19	7.19	2.78	9.97	10398.71	18½	.99	.19	1.16	4026.16
4-11-34	1 sheet	10½	19	7.15	2.8	9.95	10377.85	18¾	1.04	.20	1.24	4230.88
4-12-34	1 sheet	10½	19	6.9	2.72	9.62	10033.66	18½	1.01	.21	1.22	4162.64
7- 7-33	1 sheet	11½	17½	5.20	3.27	8.47	8834.21	18½	.92	.17	1.09	3719.08
						77.01	80321.43				9.81	33539.96
	AVERAGES:					9.626	10040.178				1.226	4192.495

Plain Layer Cake

Constant Factors: Number of layers—four
Size and material of pans: 8-inch tin
Temperature: 375 degrees.

	MAGIC CHEF						GENERAL ELECTRIC					
		Preheat						Preheat				
Date	Time (Min.)	Time (Min.)	Cons. Cu. ft.	Bake Cu. ft.	Total Cu. ft.	Total Btu.	Time (Min.)	Time (Min.)	Cons. Kw.-hr.	Bake Kw.-hr.	Total Kw.-hr.	Total Btu.
1-25-33	30	15	4.69	6.30	10.99	11462.57	38	15	.70	.41	1.11	3787.32
1-26-33	30	15	4.90	5.82	10.72	11280.96	30	15	.76	.62	1.38	4708.56
6-19-33	31	13	5.25	4.25	9.50	9908.50	31	14	.74	.48	1.22	4162.64
6-21-33	31	13	5.45	3.93	9.38	9783.34	31	14	.69	.40	1.09	3719.08
6-22-33	31	13	5.04	4.07	9.11	9501.73	31	14	.70	.47	1.17	3992.04
6-23-33	31	13	4.85	4.64	9.49	9898.07	31	14	.72	.50	1.22	4162.64
					59.19	61835.17					7.09	24532.28
	AVERAGES:				9.865	10305.861					1.181	4088.713

Bread

Constant Factors: Time and Temperature: 375 degrees for 1 hour.
Pans used: 4½ x 8½ inch tin pans.
Number of loaves in oven: 4 for each test.

	MAGIC CHEF					GENERAL ELECTRIC				
	Preheat					Preheat				
Date	Time (Min.)	Cons. Cu. ft.	Bake Cu. ft.	Total Cu. ft.	Total Btu.	Time (Min.)	Cons. Kw-hr.	Bake Kw-hr.	Total Kw-hr.	Total Btu.
1-10-33	15	3.18	10.69	13.87	14466.41	15	.78	.88	1.66	5663.92
7-21-33	13	5.53	8.40	13.93	14528.99	13	.68	.69	1.37	4674.44
7-26-33	13½	4.41	8.31	12.72	13266.96	14	.70	.81	1.51	5152.12
				40.52	42262.36				4.54	15490.48
			Averages:	13.506	14087.453				1.513	5163.493

(Continued on page 38)

High Pressure Storage

How to Select the Proper Locations and Determine the Quantity of Gas Required

By DISTRIBUTION ENGINEER

Storage Location

THE location of storage depends on its necessity, purpose, permissibility, available sites, comparative cost at various acceptable locations and numerous purely local conditions.

Necessity for storage usually limits the location to the section of a system producing the need. Frequently such need arises at a manufacturing plant and high pressure storage may be preferable to low pressure types. Advantages and disadvantages of plant location are briefly stated as a matter of comparison with location on distribution systems where more details are given, since the primary purpose in this discussion is high pressure distribution.

Storage located at a compressing plant often permits discontinuing compressing for at least one full shift with a saving in labor. With outlying or storage remote from the manufacturing plant it may be possible to discontinue compressing at various intervals but seldom for a continuous period of eight hours. Discontinuance of compressing for less than a full shift or for short intervals requires continuous attendance and the full use of attendants on other work during the intervals is seldom possible.

The load factor on compressors may be maintained at 100% during compressing periods with plant storage although the average compressor load factor per day would remain unchanged. Operating at 100% load results in a slight saving of current or fuel costs but this saving may be considered as occasionally incidental to rather than a designed function of plant storage. When compressors are installed with a capacity in excess of the transmission mains the compressors may only be run at 100% load factor when plant storage exists. When duplicate compressors are installed both may be run simultaneously when filling plant storage, thus decreasing attendance time.

Storage installed at a plant is often designed to withstand higher pressures than that ordinarily found on distribution systems as the minimum allowable pressure is higher than at distribution controls and to secure a maximum of available storage by using compressors to the highest pressure possible.

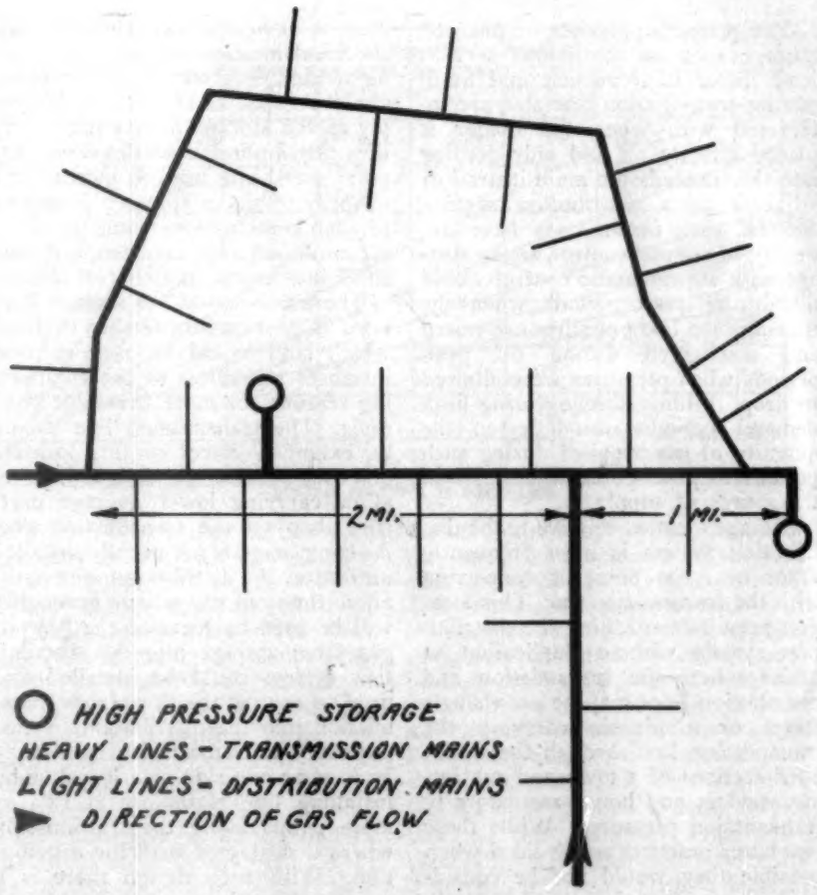
Plant high pressure storage. Twin connections intersecting outside foundations allowing bottom of tank to be closer to ground and facilities connecting to lines in street under particular local conditions. **Fig. 16.**

Storage installed on compressor outlets at manufacturing plants or compressing stations will eliminate pulsation which is only of value when control or house governors are located close to compressors having no pulsation tanks or their equivalent. Plant storage would at times also act as a condenser but would not extract certain types of gums which are particularly troublesome on manufactured gas systems.

When one or more gases to be mixed are received at high pressure the use of high pressure storage eliminates the cost of re-compressing the quantity received at high pressure.

If high pressure storage is located only at the compressing station or the quantity at the station is large compared to the outlying storage a maximum of use is secured as a plant holder, i.e., it may be filled to capacity and allowed to discharge until the minimum desirable pressure on the transmission line is reached. This filling and discharging may be repeated several times a day if necessary.

It is desirable to design high pressure plant storage so that in addition to the usual connections the compressor inlet may be fed from the high pressure storage and the compressor outlet connected so as to feed directly into the transmission main when desirable. This connection design increases available storage by



Diagramatic sketch of two transmission lines intersecting along one side of a distribution system and storage at two locations both of which require carrying full transmission pressures on distribution system. Preferable location would have been on each of transmission lines at intersection and a control placed on one end of loop line around distribution system. Fig. 17.

allowing the compressor to draw from the high pressure storage when the pressure in that storage has dropped below that desirable on the transmission line. To prevent a vacuum being formed in the high pressure storage when compressors are drawing from that storage a check valve or governor is usually installed from the low pressure to the high pressure compressor suction line. It is preferable to have compressors draw directly from the high pressure storage than to discharge the high pressure into the low pressure storage when the gas stored in the high pressure storage is to be used as a source of supply for the compressors as the higher pressure at the compressor inlet decreases the total cost of pumping.

The advantages of placing high pressure storage at the compressing stations apply particularly on systems having short transmission mains and where the distribution system is all adjacent to the plant. The load factor on the transmission line is of prime economic importance on a system as the additional investment resulting from a small increase in size of line usually exceeds the cost of outlying storage.

Some of the advantages of the station location apply in a lesser degree to outlying storage. When first constructed storage capacity usually exceeds immediate needs and may be used to provide the requirements of a system when compressors are not operating.

Outlying holders are most often justified by their effect on the size of transmission main neecssary, the main being designed to furnish the quantities necessary each day and holders supplying the difference between average and peak hourly demands. On many natural gas systems the transmission main has such an excess capacity that practically no storage is necessary, but as load is added storage must be provided and would be outlying. As the capacity of the transmission line to supply peak demands is exceeded the distribution systems farthest from the source of supply will be affected first and is therefore the first location requiring storage, although other systems nearer the source of supply may require storage for other reasons at an earlier date.

The transmission line may have sufficient capacity to provide peak hour demands but this demand may exceed compressor capacity and additional compressor installation may be delayed by the extra capacity or installation of outlying storage. The value of outlying storage in the two cases just stated is secured from improvement of load factors on compressors. The balancing of compressor, transmission line and storage investment to secure the minimum overall cost is a highly localized problem on each system.

Outlying storage should not be installed until essential, at which time a distribution system would have been in operation a sufficient period to indicate the rate of growth, actual consumer demand, and the effect of the new distribution system on the whole transmission line. The location should be selected during design but actual installation should follow the important check of experience. Often existing storage on a nearby distribution system will contain sufficient excess available storage to supply the new territory which is made available by the installation of controls feeding from the existing storage into the transmission line. Deferring storage installation provides valuable experience by noting the effect of changes in organization, rate of increase in consumers, growth of nearby territories, additional transmission lines or tie-ins, and other conditions impossible to foresee or predict at the time of an initial installation of a distribution system, any one of which reasons may make it advisable to concentrate storage rather than have individual units on each distribution system or may change the favorable reasons for the original selection.

Storage located at a distribution system intermediate between supply and the end of a transmission line requires more study than other locations as the tendency is for the intermediate storage to fill during periods when it is preferable to have the transmission line furnishing its capacity to supply storage located at end points or the peak demands on the farther distribution systems. A control on the intermediate storage to regulate pressures between the transmission and storage is essential so that the filling of the holder occurs only after the more remote demands have been provided for.

The primary purposes of outlying storage such as continuous service, load factor improvement and minimizing transmission line size are interfered with when the holder is placed directly on and only feeding into the transmission main instead of adjacent to a distribution system. Several such installations have necessitated manual control, as the storage with an automatic control would fill during peak periods when the transmission line pressures are raised and discharged during off peak periods when pressures were allowed to drop. Filling storage during peak demand periods would lessen the quantity of gas supplied during such periods to points more remote from the source of supply.

Storage location relative to the distribution system is most frequently at or near the point of connection with the transmission line. This location permits controlling the distribution system without duplication of mains where the transmission and distribution lines may be on a single street or eliminates carrying the transmission line through the developed sections of a town and subjecting services and house regulators to transmission pressures. While these two latter practices are avoided when possible they would not be considered unsafe if used.

When two transmission mains meet at or near a distribution system the ideal location for storage would be at their intersection where either could be used as the source of supply to the storage or one may carry the distribution system while the other was being used to increase the quantity of gas in storage. A variety of such combinations could be easily accomplished by a comparatively small investment in a control system.

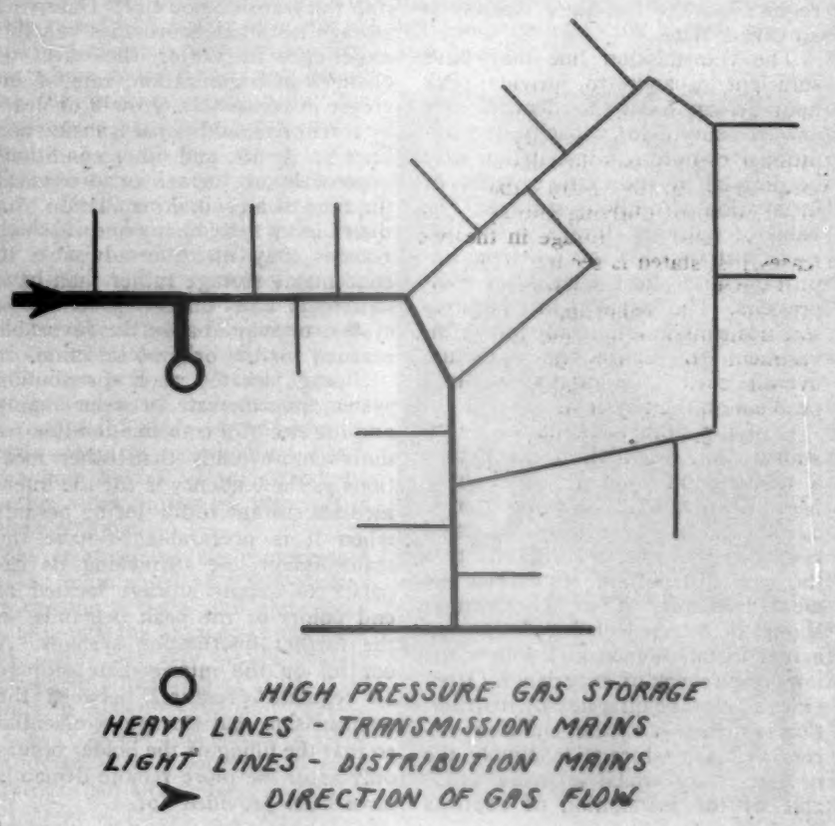
The usual reason for storage locations is previous ownership of land, which land would be used in most instances regardless of the engineering reasons for more favorable positions. The transmission line should be extended direct to this location and distribution so designed as to allow carrying lower average pressure than on the transmission line. As the storage is not usually installed until after the distribution is in operation the controls which eventually will be used to regulate the flow of gas from storage into the distribution system could be installed and used to control the flow from transmission into the distribution. When necessary a transmission main may be used as one side of a loop line by installing line regulators at two or more points along the transmission where it contacted with the distribution. With such design there is a source of supply on opposite sides of a distribution system both of which may be used to maintain service during a temporary discontinuance of an intervening section.

The general considerations outlined may not apply to all systems but all are the result of actual experience on individual systems rather than theoretical conceptions.

Quantity Of Storage

Variations in the quantity of storage selected by different designers for a location are chiefly dependent on the importance placed on "continuous uninterrupted service." Excessive investment in storage facilities has usually been the result of ultra-conservative service safety factors. The reliability of modern transmission lines is indicated by a perusal of the severe conditions to which such lines have been subjected and the few instances of consumer service interruption caused by physical failure of a transmission line. Many transmission lines traverse the Mississippi valley crossing innumerable streams ranging in size from small creeks to large rivers. Floods are common and frequently the resulting excessive land erosions will expose transmission lines or subject them to unusual strains. Such floods generally cause more extensive and intensive damage to distribution systems than to transmission systems with the result that the few repairs necessary to a transmission line are usually made in a few hours and are more rapidly completed than full repairs to the distribution system. In only one instance in modern transmission line operation has flood damage to a transmission main been sufficiently extensive so that large portions of a major city were without service. The combination of circumstances attending this interruption were such that a recurernce is inconceivable.

The earthquakes on the west coast of the United States have conclusively proved the reliability of modern transmission design and construction as the lines held practically intact under unusually severe conditions and the damage done was so slight that the service to consumers was maintained without interruption and without excessive use of storage. The storage quantities in the western territory are not above the average for the country.

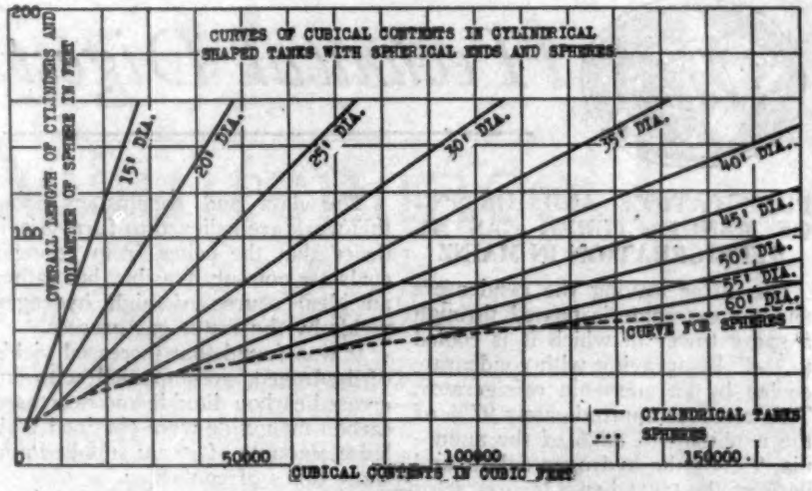


Ideal location of high pressure storage at point where transmission line intersects with distribution system allowing storage to be packed with full transmission pressure and distribution to be under a controlled pressure. Fig. 18.

The conditions cited are extreme and should not be considered in estimating quantities of storage as even a complete interruption of service to consumers under such conditions is not objectionable nor unreasonable and occurs not only from transmission but mostly from distribution failures. A complete interruption of consumer service may as frequently occur from accidents and fires at plants or compressor stations as from transmission lines. Under such extreme conditions most companies shut off the distribution systems either partially or totally as a safety precaution which allows additional time for repairs on the transmission lines.

Regardless of how perfectly the transmission line may be designed, future alterations predicted, the quality of materials selected and excellence of construction maintained, there will be occasions when the line must be out of service. Years of experience have indicated that such discontinuance will be total in but a small percentage of instances as even breaks are more likely to be partial than total and two hours is a long period of time in which to complete a temporary if not permanent repair. Two hours, therefore, would appear to be a reasonable safety factor for transmission lines being out of service and this time period would be assumed as occurring during the two hours of the day when the drain on storage would have the most effect. The major effect does not always occur from an interruption on the noon peak demand period even though the hourly send out at that time exceeds any other hours of the day as forcing the transmitting of gas during the afternoon may recuperate the loss. When the interruption occurs at the beginning of the evening peak demand period the remaining storage may soon be used but rather than provide excessive capacity advantage may be taken of the quantity remaining below the minimum pressure ordinarily acceptable. As the storage pressure is lowered beneath the minimum certain consumers may have poor pressure but the majority would receive satisfactory service for a much longer period. This advantage is true for dry type but not hydraulic high pressure storage.

As previously mentioned the total quantity of storage on a system is effective in improving the load factor of a manufacturing plant or compressor station but on an extensive transmission line the storage on each



distribution system may be increased from time to time with no visible effect on the load factors. A study of existing storage and the effect of additional storage has often been made before adding to plant facilities and is primarily a function of plant rather than distribution design.

Storage is important where the cost of gas is based not only on the total quantity purchased from transmitting companies but also depends on the uniformity of the rate of flow throughout the 24 hours. Should the rate of flow exceed or be less than the rate stipulated in a contract the cost of the gas will increase. Under these conditions of uniform load factor and importance of continuous flow rates, summation tables or curves of the hourly quantities manufactured or received and the send out including available storage at the start of the considered period will show the effect of various quantities of storage. The quantity of available existing storage is added to the consideration as in many instances of high pressure design, data is assembled to provide figures for extending a system rather than for the installation of a complete new development.

The hourly send out figures for a particular territory may sometimes be obtained from a district meter. Where no meter exists assumed figures for hourly demands throughout a day based on other territories may be used but are seldom satisfactory. A more common method is to assume the daily send out from monthly meter readings basing the maximum day on the average day for the month plus a percentage equal to the percent excess of maximum over average day at the central manufacturing plant or the metering station for a large district. The month used should be the one in which the meter readings are a maximum for the year and corrected for unread meters. The storage for the local section is then taken as a proportion of this computed maximum day which proportion ordinarily varies between one-fifth and one-half although there are extreme instances of the storage being equivalent to a total maximum day's send out. This wide range of storage in proportion to send out indicates the varying importance placed upon continuous service by different utilities. Such empirical rules are used to select storage quantities because of necessity resulting from a lack of actual data or the impossibility of accurately predicting the future. Storage design alone is an economical justification for station meters on each distribution system as they provide exact historical information on which to more accurately predict the future.

Another common method of obtaining the maximum day for design purposes is to plot the actual or computed maximum days for the past five years and extend the curve of these points five years into the future. Care should be exercised in using the maximum day thus determined as the past five years may have been a period of rapid growth such as often occurs during the initial five years of a territory. When using a projected figure the lower factor for quantity size of one-fifth is ordinarily used rather than the one-half to secure the economical advantage of increment storage construction. It has previously been mentioned as a general consideration for design purposes that no curve to determine sizes or quantities should be extended beyond five years unless

(*Continued on page* 38)

Technical Digest

PURIFICATION AND DRYING OF MANUFACTURED GAS BY REFRIGERATION IN MAINZ

Gas after leaving the condensers and tar extractor is passed through a spray tower in which it is cooled to —4° by spraying with condensate cooled by an ammonia refrigerator. This removes approximately 97% of the naphthalene, 82% of the ammonia, 9% of the hydrogen sulfide and 94% of the tar, when a tar extractor has not been used. The condensate is recirculated and finally reaches an average composition of 3% light oil and 97% ammonia liquor of 12% strength. After passing through the spray tower the gas is put through an ammonia washer. Moisture picked up in the purifiers is removed by cooling the gas with salt solution, the temperature of which depends on the atmospheric temperature and the transmission temperature. When the outside temperature was —5° C. the gas was cooled to —20° C. to avoid condensation after compression.

The capacity of the dry purifiers has been greatly increased by the efficient tar removal, and in addition freezing stoppages have been eliminated.

(H. Pippig, Gas-und Wasserfach. v. 77. p.-346-9 (1934).

PRODUCTION OF HIGH-HYDROGEN WATER GAS FROM YOUNGER COKE COALS STEAM-CARBON REACTIONS

Water gas high in hydrogen has been produced in laboratory apparatus by the reaction of steam on heated lignite char and heated sub-bituminous coke. With increased rates of steam supplied, decreased times of contact, or decreased percentages of steam decomposed at a given temperature the percentages of hydrogen and carbon dioxide are increased and the percentage of carbon monoxide is decreased. For the same rate of steam supplied at different temperatures, the percentages of hydrogen increase with lowering temperatures. The volume of hydrogen produced per unit time under the same experimental conditions is larger from steam and sub-bituminous coke than from steam and lignite char. This is probably accounted for by the greater catalytic effect of the ash in the coke.

The data and conclusions from this work are believed to furnish evidence that the cokes from younger coals are not only feasible, but rather an ideal source of high hydrogen yields by the water gas process.

It was found that increased yields of hydrogen, accompanied with increased carbon dioxide and decreased carbon monoxide were obtained with large amounts of steam supplied and short times of contact.

The percentages of steam decomposed at a given temperature, however, decreased with increased hydrogen production. The percentages of hydrogen in the water gas produced at lower temperatures, under other constant experimental conditions, increased with decrease in the temperature of the run. Thus, in the temperature ranges 600-1200° C. for lignite char and 900-1200° C. for sub-bituminous coke, the percentages of hydrogen are highest at the lowest temperature. The total volume of hydrogen produced with a given steam supply per unit time, however, is largest at the highest temperatures.

Unpublished work shows that increased pressure has little effect on the composition of the gas, and that incomplete carbonization of the char or coke prior to a water gas run gives higher carbon dioxide and hydrogen and lower carbon monoxide.

(R. E. Brewer & L. H. Reyerson, Ind. Eng. Chem. 1934, v. 26; p. 734-40).

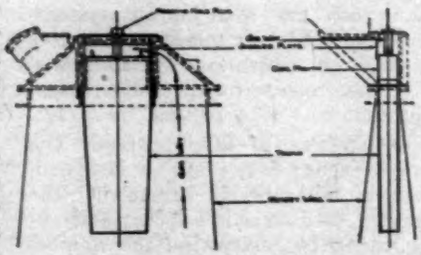
COKING PROPERTIES OF COAL IN THE LABORATORY

It is shown by a number of examples that the coking index of a coal is no measure of the property of the coke produced from it. As larger quantities of coal, coked under conditions resembling those of the coking plant, are necessary to obtain reliable results, the Bureau of Mines and, later, H. Koppers developed apparatus of the required size. The temperature to the softening point of coal which determines its coking properties. The amount of gas evolved above 450° is proportional to the shrinkage of the coke and is the main cause of fissuring. The influence of the size of coal on the temperature gradient and movement of the plastic layer through a coke oven is shown diagrammatically, and the extent of the decomposition of the primary tar, which depends on its free passage through the heated mass, is discussed.

—P. Damm, Gas-und Wasserfach 1934, vol. 77, p. 209-12.

CONTROLLED CRACKING IN VERTICAL RETORTS

The carbonizing conditions in vertical retorts at Warrington have been made to approach more closely to those in machine-charged horizontal retorts by the fitting of suitable trunks in the top of the retorts.



Design of a Trunk

On account of a reduced coal orifice and consequently higher rate of coal flow the coal is brought into the carbonizing zone more quickly while the cooled crude gas, having to pass through the superheated zone between the walls of the trunk and retort, is subjected to cracking. The degree of such cracking can be controlled by allowing the gas to pass upwards through the trunk, this amount being determined by the size of the orifice and the coal. Advantages claimed are the production of a much-improved tar, increased ease of working and thermal yield, and a wider range of fuel which can be used.

(A. H. Barton. Gas Journal. 1934, vol. 206, 908).

CHEMISTRY IN THE GAS AND COKING INDUSTRIES

The effect of temperature on the decomposition of coal as shown by the varying yields of coke, gas, tar and water is discussed. In general, the maximum gas evolution occurs at 400-450 owing to the decomposition of the oily bituminous constituents, and it is the relation of this are considerably lower than in the case of city gas. Nevertheless, the gases are considered useful as a source of gas supply to domestic and industrial users who are not connected to a gas undertaking, for use in refrigerators and as motor fuel for airships, or as raw materials in the chemical industry and for the carburation of water gas in mixture with methane.

(H. Bruckner, "Gas und-Wasserfack" 1934. vol. 77 pp. 425-429).

The Gas Meter And Its Maintenance

Part I. Covers the Importance of Selecting and Training Repairmen

By JOHN E. GODSOE,

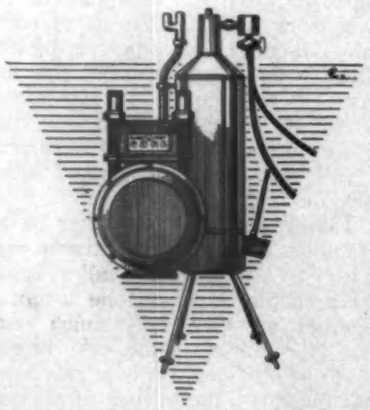
Superintendent of Distribution,
Brooklyn Borough Gas Company, Brooklyn, N. Y.

MEASUREMENTS of values is an important part in the merchandising of the products of industry. While the value of these products may rise or fall, dependent upon supply, demand or other contributing economic factors, measurement is still essential to the business of marketing commodities.

Bulk, weight, quality, quantity, performance, dimension, comparison or capacity are some of the standards in general use and are employed in some manner, whether the transaction is one of simple barter or that involving the merchandising of locomotives.

Measurement of merchandising values falls generally into two classes. In one instance, values are measured by comparison, quality or performance and in the other by bulk, weight or dimension. In the first no concrete medium of measurement is required, the purchaser relying upon his own or the experience of others to guide him toward the consummation of a satisfactory transaction. In the second instance, a tangible medium of measurement must be employed and values are determined by means of devices, mechanical or not, which have been accepted as the yardsticks by which products may be measured for merchandising transactions. It is within the second classification that customer's volumetric displacement meters fall.

When considering measurement as it relates to merchandising, it becomes apparent that while fundamentally the object sought is the same regardless of the nature of the products involved, there exists a difference in the work of measurement dependent upon the nature of the products to be measured.



Sugar, coffee, coal, grain and other staples, may be measured at the point of fabrication or distribution and upon one or more scales dependent upon the magnitude of the transaction. An almost unlimited quantity of these products may be measured upon a single scale, and the maintenance of this scale is a very simple matter, in many instances being a part of the service of the scale manufacturer.

Gas Measurement

With the marketing of gas, however, quite a different situation exists. Here the very nature of the product and its necessary mode of delivery, demands a scale for each and every one of its users. Not only is this so, but a number of these scales must be kept on hand for substitution and immediate expansion.

Aside from the necessity of measuring each user's demand upon a scale located at the point of use, the gas industry must establish and maintain points at which its many measuring devices may be reconditioned.

Such a situation requires an organization within an organization. It develops a circumstance involving an art supplementary to the business of production and distribution. It requires the administration of continual maintenance and this in a manner, not only conducive to the most satisfactory results from the viewpoint of accuracy of measurement, but from the viewpoint of economical maintenance as well.

The whole matter of measuring an individual customer's demand upon an individual customer's meter, results in complexities which do not enter the question of measurement in ordinary merchandising. Purchasers are familiar with the pound, inch, bushel, number, square feet, etc. Usually they pay for their purchases at the time of measurement. Comparatively rare, are the instances where the accuracy of the device for measurement is questioned.

With the gas meter, the situation is practically reversed. To begin with, the commodity measured is viewed by the average customer as something intangible and the device which measures it is not understood either in principle of operation or of construction. The purchaser's demand is measured and used some time before he is requested to pay for it, and because he cannot drive it like an automobile, handle it like a watch or feel its texture like a piece of cloth, his comprehension of value received is vague and without dimension.

These circumstances taken together form a situation which mitigates against the most satisfactory rela-

tionship between purchaser and seller. A bill rebated on a fast meter brings about a state of mind conducive to distrust and may result in an epidemic of high bill complaints from the purchaser's neighbors and friends. It is the knowledge on the part of the customers that meters are subject to inaccuracy that makes them incredulous of any bill higher than usual, disregarding, as they usually do, any contributing factor for which they alone may be responsible.

Study and Research

This is no indictment of the gas meter as a medium of measurement, for company records write an admirable brief in behalf of its performance, and this in spite of the many adverse conditions under which it is forced to operate; rather, it is a plea for continued study and research intended to further advance the degree of accuracy with which it does function.

Those familiar with meter maintenance are aware of the seemingly inconsistent performance of some meters sometimes. They know that a meter may be proved to 100% accuracy on open and check runs, only to have that meter, on retest, slide off several per cent. They know that incoming tests sometimes disclose a tendency to run fast or slow in groups for periods of time. On the other hand, they know that some meters, after years of service, are found to be remarkably accurate. It is almost universal practice to study causes of inaccurate performance. Perhaps we might do better to study causes of accurate performance and apply the resultant data to repair practice.

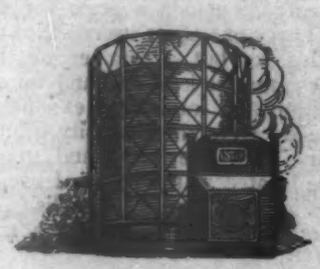
Meter Accuracy

Aside from the question of meter accuracy is that of shortened life resulting from structural weaknesses. Not necessarily structural weaknesses that might be attributed to the manufacturer, for after all, he is guided by the experience of gas companies, but for the purpose of this paper, from the viewpoint of weaknesses resulting from repair and field practice. Many meters are returned from service for oil leaks, packing gland leaks, weak seams and broken index glasses. Not all of these can be laid at the door of the meter shop, for mishandling during transportation and in the field is certainly responsible for some of these returns.

Proper meter maintenance is not, after all, a sole function of the repair shop. The meter setter, delivery man and the meter reader can contribute something toward longer meter life. Constant educational effort toward such contribution will not be wasted.

But starting with actual repair practice, the meter itself may well serve as an introduction. Here we have a device which has stood the test of time, has operated from the beginning of the sale of gas, in a commercial way, down to the present time with no indication that it will soon be superseded. Refinement of design has been the only addition to principles upon which it was conceived and first put into service. It has a minimum of parts, is compact, and stands, at times, an almost unbelievable amount of abuse, either accidentally, through lack of knowledge or in consequence of the detrimental effects of the medium it measures. Yet withal it is a delicate device in the sense that it requires scientific approach from the viewpoint of repair work and adjustment to accurate standards. It cannot be treated without due consideration and adjustment to accurate standards. It cannot be treated without due consideration and be expected to furnish a full measure of sustained accuracy or long life in return.

Taking the tin case meter as an example: it is a comparatively easy matter to assemble it. Skill as a solderer enables most anyone to put it together, yet there is so much more that is required if the best results are to be obtained. It is at this point that there is a divergence of opinion between exponents of opposite schools of thought relating to repair shop policy. There are those who contend for the piece work method as against those who favor the day work form of repair. There are, perhaps, disadvantages in both methods, but it seems to the writer that it is not so much a matter of the policy advocated as it is adherence to a mode of procedure, carefully planned and unrelentingly insisted upon. But, preceding this is the need for more careful thought in the selection and training of repairmen. Those who learn to assemble a meter without a knowledge of its principles of construction and operation will rarely turn out the finished article in the best manner.



How many repairmen can prove a meter or know the theory of adjustment? How many provers know what repair work involves? How many of either know the principles of volumetric displacement as embodied in the gas meter? The point is, that better workmanship is born of a more complete knowledge and better workmanship is bound to reflect itself in the performance of the meter when in service.

Training Important

In the work of meter repairing as in all other endeavors, the apprentice system of producing artisans is the most productive of good results. Brief, intensive courses of training intended to produce good mechanics may have merit, but catch your future repairmen young and let them wash, top, gas, test and prove meters and the investment will pay dividends in the end. Let lecture courses and training be supplementary to the apprentice system, then will the embryonic repairmen develop into full-fledged repairers who know the value of the instrument entrusted to their care.

There cannot be too much supervision to the work of reconditioning meters. The objective of the Repair Department might well be "A Maximum of Accurate Life." Every effort should be bent toward the consummation of such an objective and adequate and honest inspection is one of the best forms of assurance in an endeavor to reach it.

Progress

Recent years have witnessed much progress in the art of meter maintenance; shop design and practice have made praiseworthy strides through such mediums as an exchange of ideas, the work of the A. G. A. Meter Committee and the progressiveness of meter shop managers. Research into the matter of diaphragms, oils, metals, etc., are aiding the humble gas meter toward higher planes of performance and longer life, but results are still dependent, in a large measure, upon the kind of effort that is born at the repair bench, at the proving machines and at the gassing table.

In the papers that follow it is intended that repair shop design and practice be dealt with, not from the arbitrary standpoint that is frequently the result of experience, but rather from the angle of those things that are being done here, there and everywhere, and which seem to be worthwhile in the work of maintaining our customers' meters.

Operation Losses of Coal Carbonizing Equipment

By GLENN H. NILES, CHIEF ENGINEER

Improved Equipment—Russell Engineering Corporation

THE processing methods applied to the production of coal gas are necessarily destructive to the apparatus used, and apparent losses are unavoidable. Although these losses may be accounted for in the final economic balance, their magnitude, and the rate at which they occur, are largely within the control of the operator. Their primary cause is in the process, but the general effect may be controlled and, to a considerable extent, limited by methods of operation and a knowledge of their influence upon income and investment values.

During recent years a number of new and modified processes have been developed for the production of manufactured gas, yet the amount of coal gas produced continues to be a large proportion of all gas—generated, reformed, or processed by other methods. Almost one-half the coal gas produced by the Manufactured Gas Utilities in America is generated by the retort process, which includes the recuperative type of retort bench and gas oven, as distinguished from the regenerative type of carbonizing equipment commonly termed the by-product oven.

The increasing cost of oil, coal and coke, used in processes other than the high-temperature carbonization of coal, has created a renewed interest in coal gas as its cost of manufacture, by comparison, is more stable regardless of the fluctuating cost of raw materials. Prices of coal and coke rise and fall simultaneously and an increasing cost of coal is compensated for, to a large degree, by an increased income from the sale of coke. Coke and tar sales provide a source of profitable income, and as the manufacturing Gas Companies are badly in need of additional revenue to meet high taxes and increasing labor and material costs, it is suggested to those Gas Company officials whose plants have no coal gas equipment, to investigate its practical economical application to their situation.

Under the present stressed conditions, the coal gas manufacturer finds himself confronted with many new aspects, such as a general reduction of rates, mounting fixed expenses and operating costs. These, when combined with new load demands, make it imperative that existing apparatus be utilized to its maximum efficiency.

A characteristic that distinguishes the modern retort bench or gas oven is its inherent ability to withstand punishment. That it will continue to make gas when in a deplorable state of repairs is a seeming mystery. It is no secret, however, that under such conditions operating costs increase at a rapidly accelerating rate, which, if continued, will, in a short time, exceed the cost of repairing or rebuilding the equipment.

During the present period of rising costs of material and labor it is difficult to analyze excessive operating expenses with the same precision as is done when base costs are more stable. In the retort house having several bench units, there are usually one or two which are, as compared with the others, in poor condition, but because the production requirements in such a retort house may not have increased suddenly, the operation of the uneconomical units continues and it is only when physical difficulty in their operation occurs that their uneconomical relation to the other units becomes markedly apparent.

An increasing production cost may be the reflection of one or two causes or a combination of them.

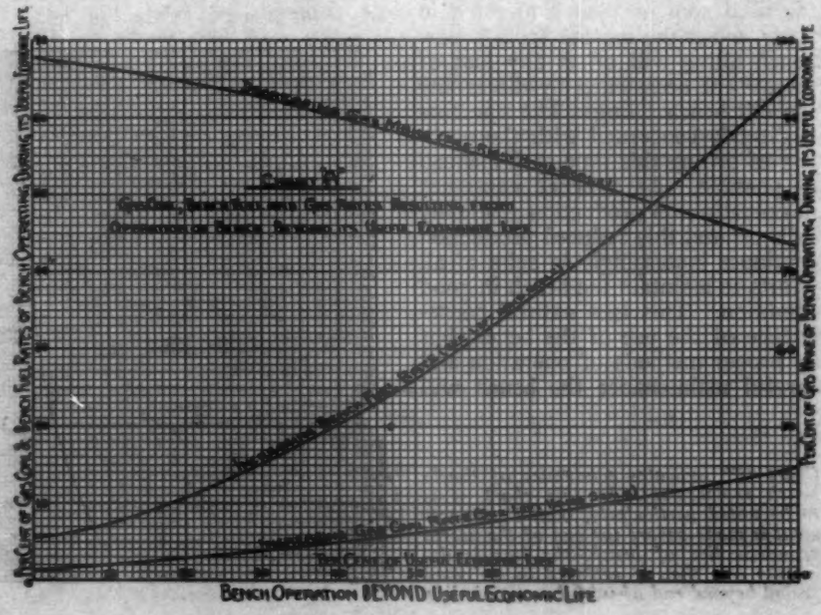


Chart "A" indicates results when bench is operated beyond its economic life

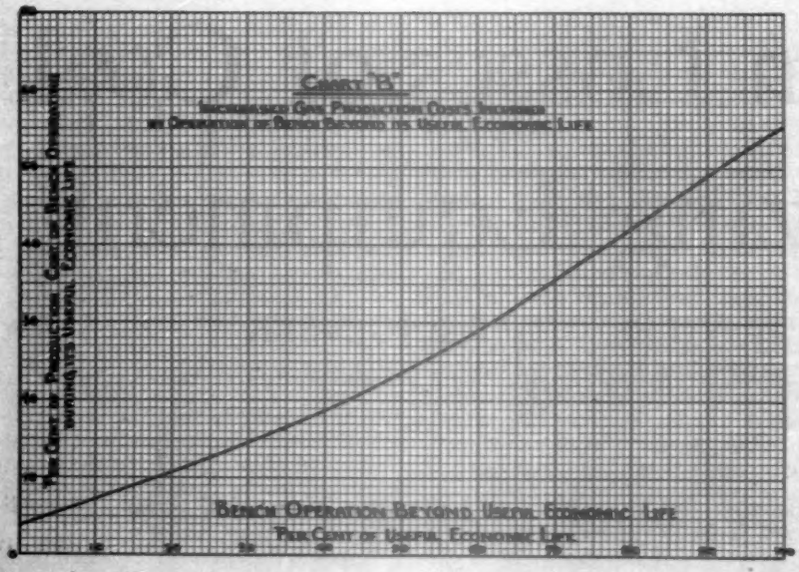


Chart "B" indicates increase of gas production cost when bench is operated beyond useful economic life.

The increase may be due to higher prices paid for labor and supplies, or to their inefficient use. In many cases, under present conditions, both may be contributing factors. If the increase is due to inefficient use of labor and supplies the responsibility points directly to the equipment, and a careful examination will disclose those units which are accountable for the loss.

As the horizontal type of bench is the more common, the following remarks are directed to it, but, in general, the statements have an equal application to inclines and verticals.

As commonly constructed, these benches consist of an "arch" and "bench-filling," equipped with either stop-end or through retorts, or ovens. The "arch" includes the supporting (partition and end) walls arched masonry roof and top paving. This structure is equipped with permanent binding, hydraulic main and gas offtake. The "bench filling" includes the retorts or ovens, producer, recuperators and their enclosing walls, and is equipped with front wall binding, furnace iron work, mouthpieces and standpipes. This iron work is removed each time the bench is refilled and is again replaced on the new filling after being reconditioned.

The life of the arch, if properly constructed and cared for will be many years, whereas, the bench filling is, in fact, consumed or destroyed during and by its own operation. New bench fillings may be installed in the arch at intervals during its life. Because of these conditions, the original investment in the arch portion of the bench is of long duration and its decrease in value takes place over an extended period. The investment in the bench filling, however, is not permanent and must be recovered over relatively short periods of time, simply because it wears out at a rate in relation to the amount of coal carbonized in it. A factor which determines to a great extent just how direct this relation may be is the treatment the bench receives during its operating life.

The price paid for a bench filling does not indicate its cost to the operator, because the filling contributes its own existence to the product and the greater the amount of gas and coke obtained from it, under economical conditions, the lower will be the actual cost of the apparatus.

The economic life of a bench filling ceases when its product is insufficient to return a fair income on the total sum of money invested in it, or, when the income from a new bench filling will offset any loss of investment occasioned by discarding the old bench filling. The operator is directly concerned with the problem of setting this time as far ahead as possible. As a bench continues in operation its production gradually falls off and this reduced production continues increasingly in spite of all efforts to maintain the bench in good condition. This is a natural consequence of the use of the bench, but by proper methods of operation and careful maintenance the bench will obviously continue in economic production for a longer time than if it is carelessly operated and poorly maintained. There is often difficulty in determining just when the uneconomical point has been reached.

Considering the subject generally, a bench filling should be replaced when maintenance involves frequent or major repairs, fuel requirements become excessive, gas leakage seriously affects the apparent yield per pound of coal, and carbonizing capacity (tons of coal per day) is reduced. Any one or a combination of these factors may be vital in their effect on the economic utility of the apparatus. The increasing rate of fuel consumption, gas leakage and reduced carbonizing capacity may be more or less accurately predicted, but the cost of maintenance and repairs is so greatly affected by the character of operation the bench receives that the rate at which the cost of these items may go up can only be generally indicated. The cost of maintaining a bench and keeping it in proper repair has such an important effect on production cost that this alone may determine whether or not a bench should continue in operation, but the fact that it is physically possible to go on repairing a bench so that it will continue to make gas often leads to its operation far beyond the economic point.

A predetermined economic life cannot be predicted for a new bench, as its period or term of operation is

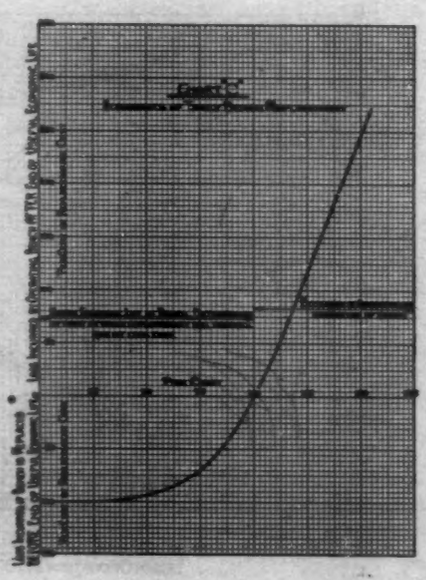


Chart "C" indicates economics of timely bench replacement. In this chart, it is to be noted particularly, that, if replacement is made before the end of the useful economic life of bench, the loss is decidedly less than if replaced in an equal period beyond end of useful economic life.

affected by so many unknown conditions. The quality of material, workmanship and design, together with the character of operation, quality of coal used, and the production demands made upon it, all have a bearing upon the length of time it may be economically operated; however, there is a time when the cost of maintaining it in operation, regardless of the quantity of its product, makes it an uneconomical piece of apparatus.

Ordinarily, a bench does not go bad suddenly, but as the end of its economic life approaches, the decrease in gas production and increase in fuel requirements become more and more apparent and the cost (per MCF of gas made) of keeping the bench in operation mounts rapidly. The normal coal rating (tons of coal carbonized per day) goes down because either full charges cannot be put into the retorts, or they cannot be burned off, and the gas rating (thousands of cubic feet per day) goes down because of the reduced amount of coal carbonized as well as the decreased net yield per pound of coal. This combination of reduced yield per pound of coal, decreased gas production per day, and increased fuel have the effect of increasing the cost of labor, supplies and equipment. Incidentally, the tar yield goes up when the retorts are less efficiently heated and constituents which should be in the gas find their way to the tar well instead.

The horizontal retort bench will carbonize from 175 to 200 tons of coal per lineal foot of D-shaped retort (heated section) during its normal life and, obviously, it is to the advantage of the operator to obtain this production in the shortest practical time. There is, of course, a limit to the production rate, beyond which any attempt to go results in permanent injury to the bench. It is also possible to operate the bench at such a reduced output as to make the product expensive, but within its range of production the operator can, by proper or improper methods of operation, make the bench cost a minimum or excessive amount of money by the time it is worn out. In other words, though the operator does not control the price paid for the bench he has direct control over its total cost to him. By reduction of the operation losses bench cost is also reduced.

Too little consideration is usually given to a determination of that point in the life of a bench at which it ceases to remain an economical unit in the coal carbonizing process, and many benches are continued in operation beyond their capability for efficient production—and to a point where they can only be operated at a loss. Such procedure is wasteful, and even though a low initial price was paid for the bench, its cost to the operator mounts increasingly after it has reached the point of uneconomical production.

Sulfur Problems in Gas Making

At the meeting of the Gas and Fuel Division of the American Chemical Society in Cleveland, Ohio, on September 13th, Dr. Wilbert J. Huff of the Johns Hopkins University presented two papers on sulfur problems in gas making which are of some interest to metallurgical and other industries which must have gases substantially free from all forms of sulfur. The first of these papers was entitled "Catalysts for the Conversion of Organic Sulfur Compounds in Fuel Gas to Hydrogen Sulfide" and was by Lloyd Logan and Oscar W. Lusby with Dr. Huff. This paper dealt with those processes in which hydrogen sulfide is almost completely removed in the usual manner, after which the gas is reheated and passed over a catalyst which converts organic sulfur to hydrogen sulfide, following which the gas is again cooled and hydrogen sulfide again removed. The experimenters had studied a large number of catalysts and had discovered certain mixtures which were very resistant and long-lived and which would convert the organic sulfur to hydrogen sulfide at high space velocities even in the presence of some hydrogen sulfide. The behavior of these catalysts was compared with that of materials already available and certain advantages noted. One interesting feature was the superiority of mixtures, the components of which when used alone were relatively inactive. One of the best materials developed contained cerium and uranium. The operating temperatures usually lay between 50 and 500 degrees Centigrade.

In the second paper by the same authors, entitled "Small Scale Studies On the Removal of Organic Sulfur and Hydrogen Sulfide from Hot Fuel Gases" it was pointed out that the adoption of a process for the catalytic conversion of organic sulfur to hydrogen sulfide was handicapped by the cost of first removing hydrogen sulfide, reheating to perhaps 500 degrees Centigrade, cooling and again removing hydrogen sulfide. Ordinary public utility operations could not warrant the imposition of these costs in the economic limits available. The authors therefore sought an operation which would not require reheating. They noted that certain of the mixtures studied in the work described above not only converted the organic sulfur to hydrogen sulfide but also retained sulfur, which could later be removed by the action of heated oxygen-containing gases. Taking advantage of this, materials were developed which could be placed in hot raw gas streams as these left the machine or retort, and could be readily revivified in place of the action of air. Previous attempts to do this apparently failed because some materials will absorb the sulfur but cannot be revivified except at very high temperatures, while other materials have a detrimental effect upon the gas composition. The materials developed by the authors showed a long life and high capacity, and in the small scale studies showed substantially complete elimination of hydrogen sulfide and organic sulphur. They were without discernible effect upon the other constituents of the gas, save that the oxygen concentration was reduced.

* *Abstracts of two papers presented at the American Chemical Society, at Cleveland, Ohio, September 13.*

Eliminating Nitric Acid From Revivified Sponge

Results of tests made by

*G. E. Seil, H. A. Heiligman and Allen Crabill**

FOR several years gas companies have been troubled with gum in their distribution systems. Mr. W. L. Shively of the Koppers Company published an interesting article in 1934 on "Gum and Problems Arising from its Presence in Distributed Gas." In 1932 and 1933 Mr. W. H. Fulweiler of U. G. I. published two papers—"The Gum Problem in City Gas" and "The Gum Problem—Recent Developments."

In these articles it is clearly pointed out that there are two types of gum; liquid phase gum and vapor phase gum. It has been quite definitely established that orifice plugging is due to vapor phase gum formed by the reaction of NO on the unsaturated hydrocarbons in city gas. It has also been established that NO is removed to some extent from city gas in dry box purification after a portion of the ferric oxide has been converted to ferric sulphide. As far as we know, the composition or structure of this iron sulphide-nitrogen oxide body has not been determined.

In our experiments we have found that this combination is quite stable and does not readily liberate nitric oxide (NO). However, after sponge has been thoroughly fouled, revivified, and replaced in the purification system, NO is liberated and the concentration of NO in the gas increases to such an extent that stoppage in small orifices is immediately noticeable.

Some cheap and simple method of breaking up the nitrogen oxide compound and removing it from revivified sponge must be found or it will be impossible to use revivified sponge, and the cost of purification will be increased appreciably. For this reason we have undertaken these experiments to determine the best way in which to eliminate nitric oxide from revivified sponge.

(Continued on page 38)

Test No.	*Remarks*	*NO in grams/MM Control Board*	*Test Board*
1.	Calibration	6.88	6.88
2.	Through new sponge (cold)	4.57	2.75
3.	With steam through new sponge	3.34	0.65
4.	Through fouled sponge (cold)	4.75	0.58
5.	Through fouled and revivified sponge (cold)	1.85	0.93
6.	With SO_2 through fouled and revivified sponge (cold)	0.93	1.86
7.	With steam through fouled and revivified sponge	1.85	27.03
8.	With steam and SO_2 through fouled and revivified sponge	1.85	36.06
9.	Through fouled and revivified sponge wetted with 5% H_2SO_3	1.55	6.12
10.	Through fouled and revivified sponge wetted with 5% $FeSO_4$ solution (cold)	0.70	69.55
11.	Same as 10 after sponge had been blown with cold air for 2 hours	1.85	26.72
12.	With steam through fouled and revivified sponge wetted with 2% NaOH solution	1.85	180.08
13.	With steam through fouled and revivified sponge—Between readings sponge was blown with air and steam for 2-hour periods		
	Start	0.37	311.91
	After 2 hours	1.85	318.86
	After 6 hours	1.85	195.84
	After 8 hours	1.85	7.40
	After 10 hours	1.85	9.12
	After 12 hours	1.85	7.40
14.	With steam through fouled and revivified sponge wetted with 2% NaOH solution—Between readings sponge was blown with air and steam for 2-hour periods.		
	Start	1.85	285.70
	After 2 hours	1.85	432.71
	After 4 hours	1.85	29.60
	After 6 hours	1.85	3.70
15.	Air and steam through fouled and revivified sponge—Readings taken every two hours.		
	Start		9.22
	After 2 hours		7.40
	After 4 hours		1.85
16.	Air and steam through fouled and revivified sponge wetted with 2% $FeSO_4$ solution—Readings taken every two hours.		
	Start		86.94
	After 2 hours		3.70
	After 4 hours		None

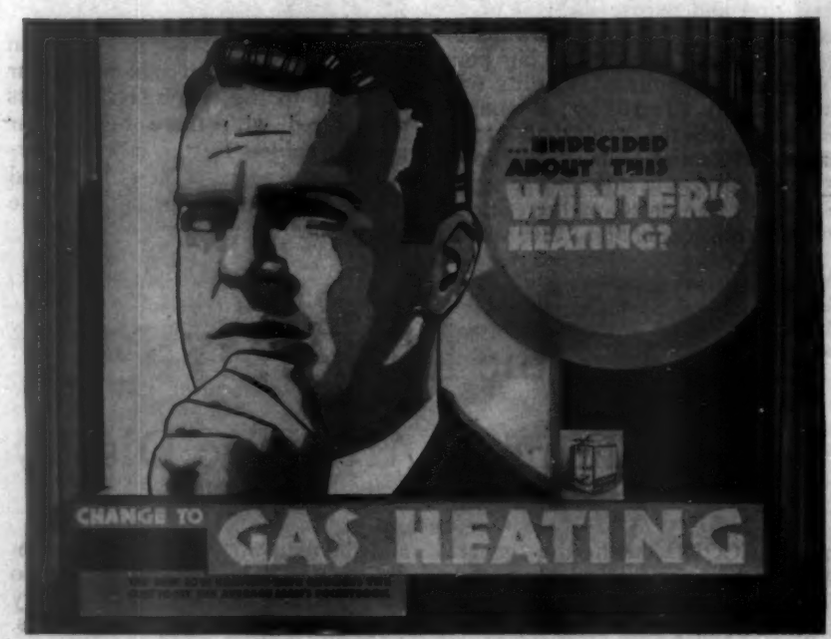
* Technical Department, E. J. Lavino Co., Philadelphia, Pa.

Sell One Thing At a Time
in your window displays

By

STUART BRATESMAN

Manager, Display Department
Boston Consolidated Gas Co.



A GREAT many gas companies are laboring under the erroneous impression that a window display should attempt to sell every possible feature of a gas appliance, or gas service thought, at one time. This treatment of utility displays goes back to the old days when nothing mattered except to have a group of appliances and suitable price cards in the window. Gradually, progressive gas companies are beginning to realize that if a window display sells *one thought,* it is doing its job. This treatment bears out an old saying that *"all* prominence is *no* prominence." Nothing could describe the thought the writer has selected better than this bit of sage advice.

If I may digress a bit, let me draw the reader's attention to the psychology behind every effective outdoor billboard. They never attempt to tell more than one outstanding thing about the products advertised. Why? Because it is an accepted fact in outdoor advertising that a poster cannot get over too much copy. Some people will argue that this might be well enough on an outdoor billboard, but it hardly applies to a window display. It *does* apply to a window display, because display set-ups are in reality third-dimension posters. The proven standards of this tremendous advertising medium can be directly applied to utility window displays. Twenty-four hour, spot advertising, like window displays have only a short space of time, usually a fraction of a second, to get over their lead lines. In this day of rush and hurry, people are not interested in reading detailed descriptions of gas appliances. The newspapers and magazines are the places for this type of copy.

It is true, however, that we can include a bit more detail in window display copy than is usually used in billboards. A successfull billboard rarely uses more than ten words, some even as few as two or three. In window displays we can tell a little more about the product, but not too much. Our headlines should be

terse and interesting. Let the floor salesman tell the prospect the detailed story of the gas appliance in question. The display's job is considered finished when the interest has been aroused.

The big job that we ask our windows to do is to make people aware of the subject, and what it will bring them in the way of convenience and economical operation. The passerby can stop and peruse the rest of the copy, *if* the headline arouses his interest. Right here is the big point in favor of simplicity in utility window display advertising; if you attempt to tell the reader all of the unrelated features about the appliance or service in question, your efforts will be wasted, as the eye cannot possibly take in all of these points at one time. There is nothing dryer than a card of listed features of a gas appliance, set in a window beside the product. Nobody will read them, but people will stop and digest something original, and terse, designed to appeal to their likes, or dislikes. In other words, window displays should be made informal and attempt to reach the passerby with human interest themes, simply and forcefully dramatized in poster form.

As an example of simplicity in window displays, let me draw your attention to the two advertisements reproduced with these lines. Far apart in subject matter, they both arrive at the same point quickly and effectively because of their terse treatment.

If a person went away from these two window displays clearly informed that a modern gas range actually makes cooking easier and that automatic gas heating might be the solution to a muddled heating problem, the displays have accomplished their purpose. These two definite thoughts were all they were supposed to tell the reader, all they *had time* to tell.

Select one outstanding feature of the subject in your window displays and play it up, by itself, instead of trying to tell the whole story at once. Try some simple, effective displays in your own windows, and you'll find that your sales and service messages reach more people, in quicker time, than before.

"Come Into the Kitchen" Theme of Attractive Display

IN ACCORD with the general movement for kitchen remodeling and improvement, the Haverhill Gas Light Company of Haverhill, Mass., has recently opened for public inspection an attractive Model Kitchen in their main office.

This model kitchen is designed to show one of the many possibilities of careful kitchen planning to combine modern beauty and modern utility for this workshop of the home and to shorten hours with reduced labor for Mrs. Housewife. It occupies a prominent place near the entrance to the showroom and is attracting considerable attention and interest.

This "All-Gas Kitchen" idea was conceived by H. W. Schell, sales manager of the Haverhill company, and the plan was executed in collaboration with local merchants who furnished the cabinets, sink, grocery supplies and kitchen furnishings. The color scheme and arrangement was designed by a local interior decorator. The names of all contributing merchants appear in the display and recognition was given each in the newspaper stories.

The latest gas appliances which are important units in the complete kitchen scheme include an Electrolux Refrigerator, a Quality Gas Range and a Rex Storage Water Heater.

A news item and actual photograph appeared in the publicity columns of the local daily newspaper together with an announcement advertisement on the same page. A

pleasing coincidence was the appearance of a news story on the same page explaining in detail the Federal Loan Plan for remodeling and modernizing homes and the entire opposite page was devoted to "Modern Home News" conducted in the interest of women readers by various authorities on all phases of home making.

The model kitchen display is visible from the street and for this reason the window display was removed temporarily and only two attractive cutout announcement cards painted in harmonizing colors occupy the window space. One reads, "Come

Into the Kitchen—the kitchen should be one of the most attractive rooms in your house—so much time is spent there. Make it beautiful, convenient and comfortable. The gas appliances that make up the All-Gas Kitchen are important units in the complete kitchen scheme. Let's Bring the Kitchen Up-to-Date." The second card reads, "Come Into the Kitchen—take a moment of your time to inspect the model kitchen inside."

The promotion of new gas appliances for the kitchen is stimulated in this manner as is evident from the interest shown and the desire on the part of customers to own a similar planned kitchen.

Ideas of a Successful Sales Manager

By John T. Bartlett

WELL along in a recent regional sales contest, a gas appliance salesman of the Cheyenne Light Fuel & Power Company, Cheyenne, Wyo., who had made a good start, began to count goose eggs in a row. Three, four, five days without a sale. Charles J. Hughes, sales manager, conferred with this salesman from day to day—went over his calls with him, analyzed each case.

The salesman really was doing good work, but meeting one of those series of delays and "bad breaks" which may happen to any salesman. Hughes encouraged the man, kept his spirit up. And after nine days without a sale, the break came. The salesman made an all-time record on gas ranges for the Cheyenne properties—he closed seven different deals in a single day!

The Cheyenne company won the contest, with a first prize for the sales manager, another first prize for the floor salesmen, and first and second prizes, in the region, for salesmen. The contest was won on number of ranges sold, but the average sale of the Cheyenne sales department was highest, too, the most popular range sold being one at $125, less allowance.

Charles J. Hughes, sales manager for a good many years at Cheyenne, practices the philosophy that "work" and "team work" are the two most important things in selling gas appliances.

"Work" implies, nominally, a standard ten calls a day for outside men; but, in practice, "work" is much more than this. Hughes does not operate upon the time-clock plan—he holds "loose reins"; but he explains frankly to the new salesman starting to work that steady, persistent effort is expected, and when he no longer is ready to deliver such, his resignation is wanted. You can't get results in gas appliance promotion without a tremendous amount of hard work.

"Team work," as this Cheyenne manager establishes and encourages it, is many-sided. There is teamwork, first of all, between sales manager and men.

Hughes does not hold the common morning "pep" meeting. In theory, this is excellent, but, in practice, Hughes believes that it can become not only unnecessary, but a very harmful negative influence.

The intent of the morning gathering is to inspire and stimulate salesmen. In practice, it is an extremely easy thing for the sales manager to make a remark which "gets under the skin" of one or more of his men. Salesmen adjourning from "pep" meeting to a nearby pool hall to spend the forenoon in gloomy, angry discussion of grievances, are not rare, but actually common, individuals. It is possible to spend too much time in conference with salesmen. Like the salesman who talked himself out of a sale, a sales manager can talk himself out of salesmen confidence and loyalty.

So Hughes only holds a morning meeting when there is some special reason for it. However, during the day, he has frequent contact with individual men. He knows in detail what each is doing. He studies each as a problem in morale, and tries to have just the right treatment, as with the salesman who slumped in the middle of a sales contest.

Some have to be praised, some criticized; but always there can be sincerity present, with a real understanding of the individual and his personal, as well as prospect, problems.

Hughes trains his men, each of whom has his individual territory, to work one with another; and every month considerable total of sales is recorded made outside of the salesman's own territory. The principle is, of course, that every salesman will have certain prospects whom, for some individual reason, he cannot sell, but whom another good salesman should be able to "push over."

On this basis, these Cheyenne salesmen frequently sell outside their own territory.

In the opinion of Mr. Hughes, one of the most important things in contest promotion is the thought which the sales manager should have for the "morning after," referring to the period immediately following the contest, when salesmen who have been working at top-pitch for several weeks are likely to go stale, and demonstrate a strong reaction in the form of very small sales. Many an individual salesman, in fact, who sets a "peak" pace, is running toward this danger. It is the experience of Mr. Hughes that considerable can be done to modify reactions from highly-stimulated effort. The "reaction" which the typical salesman will let himself indulge in is altogether too great, and good coaching will have him out of the slump quite quickly.

It's mostly a question of what the salesman sets out to sell, whether the gas range is a $69.50 one, or a $125 model, Mr. Hughes finds. The prospect brought to the sales floor, or a spontaneous visitor, is shown first the best range even if there has been a definite request to see a low-priced one. The salesman goes down, next, to the cheaper ranges; but psychologically, the process to sell the quality range has been skilfully started.

In the same way, salesmen calling at a home with a canvassing tip show the housewife first the picture of a featured quality range.

This procedure in approaching the sale, Hughes finds, is the most important element in keeping the average sale high. Confidence, of course, is an element. Once the salesman has learned that it is as easy—perhaps easier—to sell a quality range as a cheap one, he continues to turn in high-quality sales.

A healthy sales force hard at work might be one description of this Cheyenne sales manager's system for best gas appliance sales. The sales manager's job is to maintain such a condition the year 'round, year after year.

SALES SLANTS

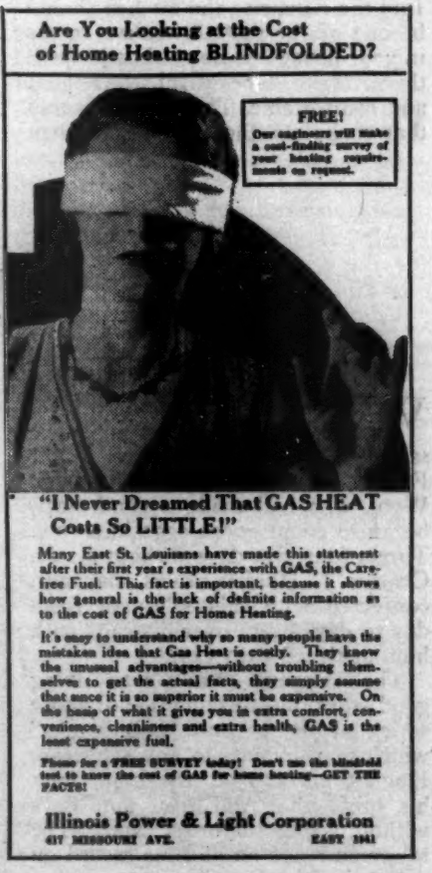
JUST a small amount of heat now and then, even in the winter months, suffices in Los Angeles, for heating the home, yet hot water is wanted many times during each day, and almost daily there appears in some newspaper or community periodical, the following advertisement:

AN EFFECTIVE method of telling customers of the advantage of house heating by gas was used by the Delaware Power and Light Company of Wilmington in the telegram idea reproduced herewith:

HERE'S a home heating advertisement that, to say the least, will compel attention. It seems to us that advertisements along this line should secure good customer reaction, for a great many folks do have an extravagant idea about the cost of gas for home heating—fact is they "Are Looking at the COST of Home Heating Blindfolded."

SEEMS to me that we gas men may do well to do a little "contesting" like the radio advertisers. Having folks do things seems to get a lot of interest. The Jersey Central Power and Light Company used a rhyme contest in a most effective way. Seems they had folks make rhymes about appliances and their use, awarding the best rhymester with a bit of cash or a credit on the purchase of the appliance he rhymed about. Over in Illinois there is a fellow that we heard about who did a bang-up job of selling automatic hot water service through the use of unfinished limerick contests.

WHEN you consider "special low prices" remember that they are an *inducement* not a stock in trade. Never let your special price sales drag out too long. Two weeks is ample time to offer "specials" and they should never run for more than thirty days. Be sure that you close your sale promptly on the day specified, too.


Are You Looking at the Cost of Home Heating BLINDFOLDED?
FREE!
Our engineers will make a cost-finding survey of your heating requirements on request.
"I Never Dreamed That GAS HEAT Costs So LITTLE!"
Many East St. Louisans have made this statement after their first year's experience with GAS, the Carefree Fuel. This fact is important, because it shows how general is the lack of definite information as to the cost of GAS for Home Heating.
It's easy to understand why so many people have the mistaken idea that Gas Heat is costly. They know the unusual advantages—without troubling themselves to get the actual facts, they simply assume that since it is so superior it must be expensive. On the basis of what it gives you in extra comfort, convenience, cleanliness and extra health, GAS is the least expensive fuel.
Phone for a FREE SURVEY today! Don't use the blindfold test to know the cost of GAS for home heating—GET THE FACTS!
Illinois Power & Light Corporation
617 MISSOURI AVE. EAST 1141

ONE company that is making range sales these days accomplishes them

via a weekly store demonstration of "New Dishes." The home service department digs up a lot of brand new dishes each week—advertisements feature the "New Recipes," the demonstrations are held and the home service department gathers leads for salesmen—another old idea with a new punch in it.

425,000 gas ranges were sold during the first half of this year, according to reports. This is good news and indicates that despite all the talk to the contrary GAS is still the accepted fuel for cooking and for a number of other things. As we read this good news we feel that it should be broadcast to the brethren who have been more or less holding back in the matter of "old fashioned range campaigns."

HEAT-O-GRAM

Delaware Power and Light Company

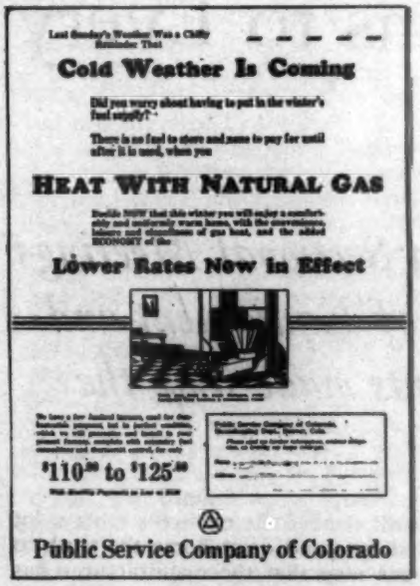
AUG-10-1934

YOU SHOULD HAVE DEFINITE ESTIMATE ON COST OF HEATING YOUR HOUSE THIS COMING WINTER WITH GAS STOP YOU CAN INSTALL HEATER NOW AND PAY NOTHING UNTIL OCTOBER STOP BOTH EQUIPMENT AND FUEL COSTS CAN BE BUDGETED CONVENIENTLY STOP IT MEANS NO MORE SHOVELING COAL HAULING ASHES OR RUNNING UP AND DOWN STAIRS STOP ITS CONSTANT EVEN HEATING MEANS GREATER COMFORT AND BETTER HEALTH FOR ALL THE FAMILY STOP MANY OF YOUR NEIGHBORS NOW USING IT FIND THE COST SMALL STOP FOR THE FACTS AND FIGURES ON GAS HEATING PHONE TODAY - 6-211 STOP THERE IS NO OBLIGATION

DELAWARE POWER AND LIGHT CO.

FOR COMFORT — HEAT WITH GAS

IN COLORADO climatic conditions are so much different, and the best heating appliances are needed to


Last Sunday's Weather Was a Chilly Reminder That
Cold Weather Is Coming
Did you worry about having to put in the winter's fuel supply?
There is no fuel to store and none to pay for until after it is used, when you
HEAT WITH NATURAL GAS
Decide NOW that this winter you will enjoy a comfortably and uniformly warm home, with the convenience, cleanliness and economy of gas heat, and the added ECONOMY of the
Lower Rates Now in Effect
$110.00 to $125.00
Public Service Company of Colorado

meet the rigor of winter, and the Gas Company is using much space in the newspapers to convince the people that for the most comfortable, easy to handle, heating appliances, gas is King. The advertisements are convincing and a sales-getter. One of these is reproduced herewith so that you may see what a successful concern is doing to garner more business:

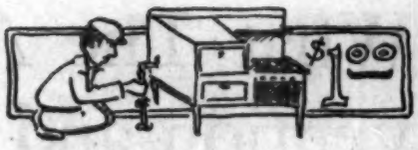
WOMEN, it is said, like the type of advertising that puts the advertiser in the place of the consumer—use his viewpoint—for they say that when they read advertisements of this type they feel that the same spirit has been put into the product advertised. Again it's that old idea of "What it will do for you."

TO INDICATE that folks were buying a popular new gas range a western gas company installed a "blow-up" chart showing the names of recent purchasers at its service counter. This type of "see what other folks are doing proved a wonderful testimony and sped up sales for the particular model in a big way. You might try the idea in connection with the next appliance you feature.

A READER of this page sends us copies of bill flyers that are being used by gas companies in the middle west. We reproduce them here as idea provokers for those who contemplate promoting GAS water heating or GAS cookery. The flyers are printed in two colors, red and black on a yellow stock. They certainly compel attention.

THE store that is well lighted indicates progressiveness, while the store that is poorly lighted denotes slovenliness and says the manager is lazy. Good light is about the least expensive thing that to-day's live retailer can purchase. A modernly illuminated store gets over a big selling message.

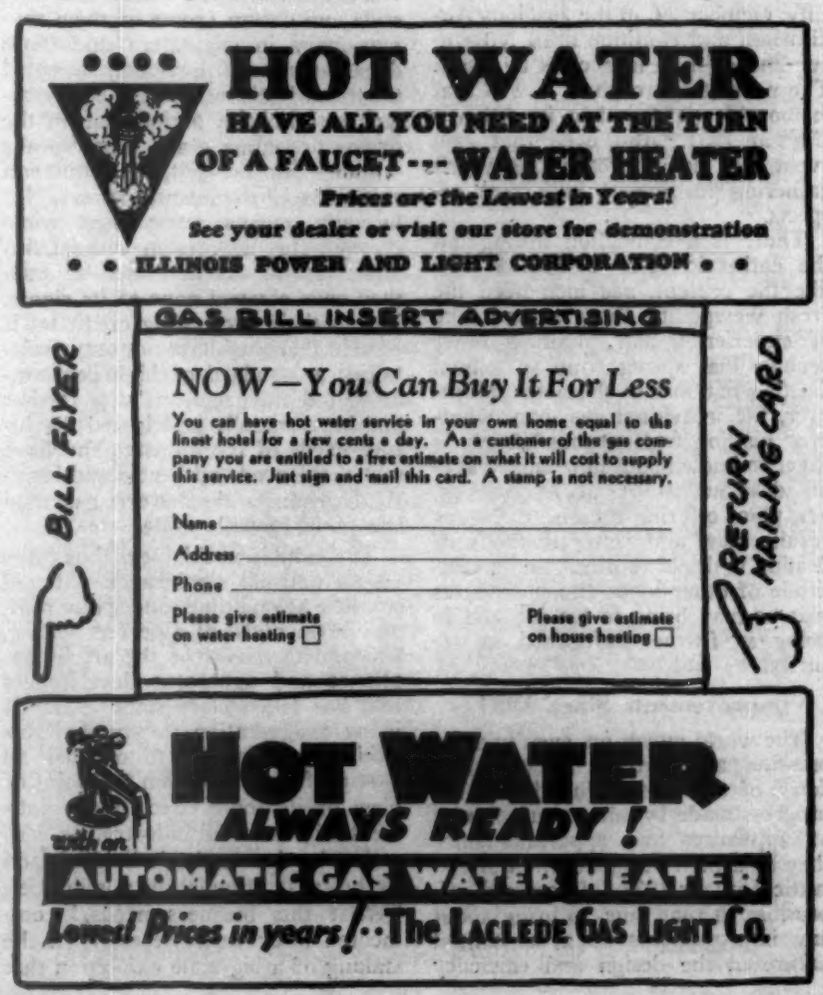
ONE gas company confronted with the problem of retaining the cooking load conceived the idea of paying service men and meter readers $1.00 for every reconnect order that they brought in. This resulted in a complete survey of the distribution system by these men and many reconnects. Prior to the time the survey was made it was the company's policy to make a minimum reconnection charge of $2.00 per range. This charge was temporarily waived after the completion of the survey, and the men used this as a sales argument, telling old customers that the reconnection, if made at this time, would be made without charge and that the minimum bill would be only 50c per month. "Think what it means to have gas for hot water in case of illness or gas for heat in case



of a sudden cold snap" was the gist of their sales talk. It is reported that, while the plan has been in operation but a few weeks, the management says that it is highly successful and just another thing that will keep other fuels out of the kitchen.

WITH the coming of cool days and long evenings gas men will find that their window displays will gain

circulation if they are thoughtfully planned and installed—gas heaters and water heaters will fit in well during the next two months. Tie your windows into your newspaper and other forms of advertising.


HOT WATER
HAVE ALL YOU NEED AT THE TURN OF A FAUCET---WATER HEATER
Prices are the Lowest in Years!
See your dealer or visit our store for demonstration
ILLINOIS POWER AND LIGHT CORPORATION
GAS BILL INSERT ADVERTISING
BILL FLYER
NOW—You Can Buy It For Less
You can have hot water service in your own home equal to the finest hotel for a few cents a day. As a customer of the gas company you are entitled to a free estimate on what it will cost to supply this service. Just sign and mail this card. A stamp is not necessary.
Name
Address
Phone
Please give estimate on water heating
Please give estimate on house heating
RETURN MAILING CARD
HOT WATER
ALWAYS READY!
with an
AUTOMATIC GAS WATER HEATER
Lowest Prices in years!--The Laclede Gas Light Co.

What The A.G.A. 16th Annual Convention and Exhibit Means to Every Gas Man

The programs for the General Sessions and Sectional Meetings are stimulating and instructive-Exhibits of Equipment and Appliances reflect the many improvements made since the 1931 Exhibit

CONVENTIONS, it is sometimes claimed, are all alike. Attend one and you have attended all.

Not so, however, in our industry, particularly this year. The Sixteenth Annual Convention and Exhibition that will open in Atlantic City, October 29, in the spacious Auditorium and continue until November 2nd, will be in a class by itself. The nearest approach to it was that memorable get-together in Atlantic City in 1931. But even that gala event will not approach this year's gathering in several important respects.

There is a conviction throughout the entire industry that at a time like the present, gas men need the fresh viewpoints, the give and take of experience, and countless other benefits that spring from an annual meeting national in character. Moreover, the individual gas man, whatever his job and responsibilities, is eager to know about new money-saving ideas, new short-cuts to economy, new plans offering promise of bigger results, new and better methods of dealing with old routines, and a multitude of other ideas and procedures that he may bring to his job and in doing so further safeguard its security.

Improvements Since 1931

The world moves on, even in a depression, and there is no better evidence of this close at hand than the progress made by our manufacturers of appliances and apparatus since they held their last exhibition at Atlantic City in 1931. It seemed impossible, at that time, to bring about any improvements of a substantial nature in the design and efficiency of certain of these appliances. They appeared to represent the ultimate.

Yet look at what has happened since then—an interval of but three years, and with business a victim of the jitters. More improvements and advances, more changes in style and design (some of them revolutionary in character) and more departures from previously accepted theories of utilization have been realized in this brief period than in the fifteen preceding years. That speaks volumes for the grit, determination and nerve of the manufacturers. Not by any means have they come through this depression without financial scars. As a matter of fact, they have escaped none of its rigors. Yet to their everlasting credit let it be said that they have not only maintained a standard of high performance, but have gone a step farther and have actually anticipated the future needs of the industry and have met those needs with new and beautiful products that every gas man can point to with pride.

The exhibition this year thus takes on an unusual significance. It will produce at one time, under one roof, and in the midst of a perfect setting, a complete record of the art of appliance and apparatus development that has taken place since 1931. It is no exaggeration to say that this exhibition bids fair to outclass all past performances from the point of view of its tonic effect upon sentiment within in the industry, its educational value to the individual, and its business stimulating possibilities. "What this business needs," commented an executive recently, "is the staking of a big-scale exhibition that will remove the cob-webs from a lot of eyes and drive home the truth to gas men that the manufacturer has provided us with the latest and best equipment scientific and engineering knowledge can produce, and it is now up to us to sell it."

Having had no exhibition in three years, gas companies are determined to make the most of this one. A number of companies will instruct their delegates to return home with a complete story of everything that is new in the exhibition. This information will be relayed throughout their organizations.

Exhibition Stellar Attraction

President Castor, in a recent letter stated: "By all odds, this year's Exhibition is of outstanding importance—not alone because it is the first event of its kind in three years, but because in that period gas appliances and gas plant equipment have undergone many revolutionary improvements. To the gas man, therefore, the forthcoming Exhibition is a stellar attraction.

"There is another large group, however, whose interest this year in appliance developments and particularly in the Exhibition itself is very real. I refer to the dealers who sell appliances. Many of them will be in attendance at Atlantic City as the guests of gas companies. I wish it were possible for all gas companies to do this, but since it is out of the question because of distance and the large expense involved, I suggest that each company communicate with its dealers and invite them to be with us at Atlantic City.

"By extending such an invitation in person or by letter we will further

cement the friendly relations existing between our industry and it dealers, and at the same time broadcast word of the Exhibition in quarters where it is bound to do us much good."

It takes six months to stage an A. G. A. Convention. Much of the time has been devoted by the A. G. A. to the selection of competent speakers and topics for live current interest for the General and Sectional Meetings. It has been evident for months past that the 1934 convention program should provide specific aids and helps that might be translated by the individual into more efficient performance on the job. The program developed for the coming Atlantic City meeting comes up to this requirement in every respect. In a word, it is a program built to order for the individual and his particular needs, yet comprising a consideration of the most vital national issues before the industry today—issues that are the personal concern of every progressive thinker in our business.

Speakers have been chosen whose records of accomplishment in their particular spheres of activity give to their messages a ring of authority. Many of these are hard-working committee members who have devoted months of earnest effort to the preparation of their addresses and reports. The program for General Sessions has not been completed at this date, but the Sectional programs, with a few exceptions, are in final shape.

Monday Program

The first business session at the Convention will be held by the Natural Gas Department in the Ambassador Hotel, starting Monday morning, October 29, at 9:30 o'clock, and extending through the afternoon. At 6:30 o'clock in the evening of that day will be held the annual dinner of the Executive, Managing and Advisory Committees of the Natural Gas Department. Three hours later, in the Grand Ball Room of the Auditorium will be staged "Natural Gas Nite." This is to be an old-fashioned get-together such as the natural gas men have not had in recent years. Details of this entertainment feature will be announced later.

The program for the meeting of the Natural Gas Department will consist of eight addresses and four reports. At the annual meeting of the Main Technical and Research Committee on Monday morning, H. C. Cooper of The Hope Natural Gas Company, Pittsburgh, Pa., will deliver his report as chairman of that committee. The annual meeting of the Department convenes at 11 o'clock and reconvenes for the afternoon session at two o'clock. Speakers will be Frank L. Chase, Lone Star Gas Company, Dallas; George W. Ratcliffe, Manufacturers Light & Heat Company, Pittsburgh; L. J. Willien, Byllesby Engineering & Management Corporation, Chicago; Burt R. Bay, Panhandle Eastern Pipe Line Company, Kansas City; John B. Tonkin, Peoples Natural Gas Company, Pittsburgh; Elmer F. Schmidt, Lone Star Gas Company, Dallas; A. F. Bridge, Southern Counties Gas Company, Los Angeles; B. C. Comfort, Mississippi River Fuel Co., St. Louis; and B. H. Gardner, Columbia Gas & Electric Corporation, Columbus, Ohio.

Tuesday Program

The first General Session opens Tuesday morning in the Auditorium, the program featuring the annual address by the President, the Managing Director, the Treasurer, and a short talk on the International Gas Conference by Clifford E. Paige of The Brooklyn Union Gas Company. On the afternoon of that day are scheduled the first meetings of the Accounting, Commercial, Industrial Gas and Technical Sections.

The Accounting Section will present reports by chairmen of several of its committees, and an address to be given at this session will be announced later. Speakers include: E. B. Nutt, Standard Oil Company of New Jersey; Pittsburgh; J. M. Roberts, The Peoples Gas Light & Coke Company, Chicago; A. S. Corson, The United Gas Improvement Co., Philadelphia; C. J. Fue, The Brooklyn Union Gas Company, Brooklyn; F. J. Bischoff, Consolidated Gas Company of New York; F. W. Cooper, Public Service Electric & Gas Company, Newark; E. R. Rotramel, The Peoples Gas Light & Coke Company, Chicago; E. J. Tucker, Consumers Gas Company of Toronto, Canada; J. F. Weeks, Kings County Lighting Co., Brooklyn; J. J. Natale, Philadelphia Electric Company, Philadelphia; W. S. Bowser, The Koppers Company, Pittsburgh; H. E. Cliff, Public Service Electric & Gas Company, Newark; J. M. Kramarsik, Connecticut Light & Power Co., Hartford, and J. W. Mackie, Delaware Power & Light Corporation, Wilmington.

The Commercial Section opens with an address by the Chairman, N. T. Sellman, Consolidated Gas Company of New York. R. A. Malony, Chairman of the Refrigeration Committee, follows with a paper on "What a National Campaign Like The Blue Vase Contest Can Do for the Industry." Two addresses on Cooperative Range Campaigns will complete this session, one by F. M. Banks, Southern California Gas Company on the Cooperative Campaign on the Pacific Coast with Clock-Controlled Ranges, and the other by C. A. Luther, The Peoples Gas Light & Coke Company, Chicago, on Campaign Operations in the Chicago Area.

The Tuesday afternoon session of the Industrial Gas Section provides for the address of the Chairman, F. B. Jones, Equitable Gas Company, Pittsburgh, and includes three outstanding contributions of live interest to industrial gas men today. These are, "Ceramics and the Potential Market for the Gas Industry," by L. S. Briggs, Ceramist, Lenox, Inc., Trenton, N. J.; "Process Air Conditioning and Low Temperature Drying," by M. Lednum, Engineer, Silica Gel Corporation, Baltimore, and "Market for and Promotion of Retail Industrial Gas Sales," by H. A. Sutton, Public Service Electric & Gas Company, Newark.

The Technical Section features the following on its Tuesday afternoon program: Chairman's Report, O. S. Hagerman, American Light & Traction Company, Chicago; "New Meter Repair Shop," C. H. Stevick, Consolidated Gas Company of New York; "Review of Work on Pipe Coatings and Corrosion for 1934," by Dr. Scott Ewing, U. S. Bureau of Standards, Washington, D. C.; "Purging," S. S. Tomkins, Consolidated Gas Company of New York; "Review of Developments in Distribution," H. W. Battin, The United Gas Improvement Company, Philadelphia; "Features of Heavy Oil Operation—Citizens Works," F. B. Parke, The Brooklyn Union Gas Company, Brooklyn.

Wednesday Program

Wednesday morning starts off with the Home Service Breakfast Conference at which two-minute talks will be devoted to the following topics: Home Demonstrations, Girl Scout Classes, Home Service Plays, Regional Meetings — Pacific Coast and New England, School Cooperation, Little Women's Cookery Club and Public School Contacts. At four o'clock in the afternoon a meeting of Home Service Directors will be held at which the three following addresses will be delivered:

"Consumer Standards," Alice Edwards, American Home Economics Association, Washington; "New Methods of Meat Cookery," Inez Willson, National Live Stock & Meat Board and "Laundering Methods," Faye Hamilton, McCall's Magazine.

Wednesday morning's program for General Sessions will present the following: "Selling Industrial Gas," F. T. Rainey, The Ohio Fuel Gas Company, Columbus; "The Gas Industry's Next Opportunity," Lyle C. Harvey, Bryant Heater Company, Cleveland; a report on A. G. A. Laboratory activities and the probable presentation of four brief and pointed addresses on mass selling.

The Commercial, Industrial Gas and Technical Sections will have afternoon meetings on Wednesday. Scheduled for presentation at the Commercial meeting are: "Electric Competition in the Domestic Field," W. W. Winter, Atlanta Gas Light Company, Atlanta; "Gas Industry and Home Demonstration," H. P. J. Steinmetz, Public Service Electric & Gas Company, Newark; "Why a Major House Heating Campaign—Its Advantages and Results," Victor Starzenski, New York Power & Light Corporation, Albany; and "Sales Development Plans," H. E. Dexter, Central Hudson Gas & Electric Corporation, Poughkeepsie, New York.

The meeting of the Industrial Gas Section will take the form of a round-table discussion, affording ample opportunity for the individual's personal participation in the program.

W. M. Hepburn, Surface Combustion Corporation, Toledo, will act as discussion leader for the topic, "Furnace Atmosphere Control." C. W. Gale, Public Service Company of Colorado, Denver, will lead discussion on "Instances of Unusual Applications of Gas Fuel." Other subjects that will be covered are, "Effective Saving of Gas Fuel by Use of Insulation Refractory Materials" and "Light Fuel Oil Competition." Speakers for these two subjects will be announced later.

On the Technical Section program for that day are: "To the Customer —You Are the Gas Company," I. K. Peck, Boston Consolidated Gas Company, Boston; "Review of Developments in Gas Production," J. V. Postles, The Philadelphia Gas Works Co., Philadelphia; "The Gum Problem," W. H. Fulweiler, The United Gas Improvement Co., Philadelphia; "Gas Analysis in a Study of Water Gas Operations," L. J. Willien, Byllesby Engineering & Management Corporation, Chicago; and "Summary of Activities of the Chemical Committee," E. F. Pohlmann, The Peoples Gas Light & Coke Company, Chicago.

No meeting of the Accounting Section will be held on Wednesday, but members of the Section will attend a Luncheon Conference at the Ritz-Carlton Hotel on that day, and will have ample opportunity to visit the exhibit of accounting machines at the Exhibition.

Thursday Program

Thursday's business programs open with a meeting of General Session at which one of the outstanding speakers will be Dr. Neil Carothers, since 1923 Professor of Economics and Director of the College of Business Administration at Lehigh University. Dr. Carothers will deliver an address on "The National Economic Situation." Another speaker at that session will be Geo. E. Frazer of Chicago, counsel for the Gas Appliances Institute. Mr. Frazer is nationally known as an organizer of business and is thoroughly familiar with developments in Washington as they affect the manufacturer and market practices. The topic of his address is, "The Manufacturer, The Utility, and Dealer Relations." It is also planned to have this session include an address by a prominent member of one of the state regulatory bodies.

The Accounting and Industrial Gas Sections will continue their sessions on Thursday afternoon. The newly appointed Publicity and Advertising Committee of the Association will also hold a luncheon symposium at the Ritz-Carlton Hotel on that day, at which all advertising men in the gas industry, as well as members of the Public Utilities Advertising Association, are invited. R. S. McCarty, advertising manager, The Philadelphia Company, Pittsburgh, will lead discussion on "National Advertising Sometime Versus Regional Advertising Now." Fordham C. Russell, sales manager of the H. H. Robertson Co., building materials, Pittsburgh, will lead the discussion on "Selling Industrial Gas by Direct Mail Advertising." Mr. Russell will point out how successful direct mail results in his business can be used by industrial gas men. Other topics up for consideration are, "Advertising in Competition With Government Sponsored Business" and "Promotional Possibilities of the A.G.A. Laboratory Seal."

The Accounting Section program will include the following: Uniform Classification of Accounts Committee, H. M. Brundage, Consolidated Gas Company of New York; Natural Gas Representatives Committee, L. L. Dyer, Lone Star Gas Company, Dallas; Customer Accounting Committee, E. N. Keller, Philadelphia Electric Company, Philadelphia; and Customers Relations Committee, W. G. Murfit, Philadelphia Gas Works Company, Philadelphia.

The following topics and speakers are also included on this program: "Customers' Deposits," R. B. Milne, Columbia Gas & Electric Corporation, New York; "Control of Customer Accounting Procedures," L. A. Mayo, Connecticut Light & Power Company, Hartford; "Cash Receiving Procedure," W. H. Goforth, Philadelphia Gas Works Company, Philadelphia; "Effect of Credit and Collection Policies on Customer Relations," S. H. Corson, Philadelphia Electric Company, Jenkintown; "Customer Relations in Smaller Communities," J. B. Jones, Bridgeton Gas Light Company, Bridgeton, N. J., and "Management's Responsibility in Employee Customer Contacts," Louis Stoecker, Public Service Electric & Gas Company, Newark.

The Industrial Gas Section will convert its meeting into a Hotel, Restaurant and Food Products Sales Symposium. On this occasion, C. F. Stoddard of New York, owner and operator of Butler Hall, will deliver a talk on "Restaurant, Hotel, Food Preparation and Control Devices." He will be followed by F. H. Trembly, Jr., The Philadelphia Gas Works Company, who will speak on the "Competitive Situation and How to Combat It in the Small and Large Bakery." Other speakers and their topics are C. W. Roll, The Brooklyn Union Gas Company, "The Modern and Improved Hotel and Restaurant Appliance," and T. J. Gallagher, The Peoples Gas Light & Coke Company, Chicago, "Dealer Cooperation."

Entertainment

Delegates to this year's Convention need fear no dull times as far as entertainment is concerned. Mention has been made previously of "Natural Gas Nite" to be staged Monday evening. This will be the natural gas men's party, but other entertainment functions are scheduled for the evenings of Tuesday, Wednesday and Thursday, which will be open to everyone attending the Convention. In addition to these A. G. A. functions, Atlantic City, the "World's Playground," will offer a variety of entertainment features peculiarly its own.

EXHIBITORS AT AGA CONVENTION

A-B Stove Co., Battle Creek, Michigan..... 318
Addressograph-Multigraph Corp., Cleveland, Ohio 426
Alcazar Range & Heater Co., Milwaukee, Wis. ... 410
Air Reduction Sales Co., New York, N. Y. 227
Alpha-Lux Co., Inc., New York, N. Y. 225
American Brass Co., Waterbury, Conn. 509
American Cast Iron Pipe Co., Birmingham, Ala... 106
American Gas Journal, New York, N. Y. 204
American Gas Products Corp., New York, N. Y. 419, 420
American Meter Co., New York, N. Y. 400, 401
American Stove Co., Cleveland, Ohio.....406 to 409
American Thermometer Co., St. Louis, Mo. 134
Autogas Corporation, Chicago, Illinois..... 126
Automatic Products Co., Milwaukee, Wis. 519
Bailey Meter Co., Cleveland, Ohio 104
Barber Gas Burner Co., Cleveland, Ohio..... 135
Bartlett Hayward Co., Baltimore, Md..... 325
Blodgett Co., Inc., G. S., Burlington, Vt. 516
Bristol Co., Waterbury, Conn. 100
Bryant Heater Co., Cleveland, Ohio.....505, 506
Burdett Mfg. Co., Chicago, Ill. 610
Burnham Boiler Corp., Irvington, N. Y. 125
Burroughs Adding Machine Co., Detroit, Mich. 425, 502
Buchan Loose Leaf Record Co., Clifton Heights, Pennsylvania 640, 641
Chase Brass & Copper Co., Waterbury, Conn. ... 130
Caloric Gas Stove Works, Philadelphia, Pa. 518
Canadian Gas Association-Intercolonial Gas Journal of Canada..... 634
Carson-Cadillac Corp., Birmingham, Ala. 326
Chace Valve Co., W. M., Detroit, Michigan..... 517
Chambers Corp., Shelbyville, Ind. 611
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa. 525
Cleveland Heater Co., Cleveland, Ohio..... 311
Cleveland Trencher Co., Cleveland, Ohio..... 632
Connelly Iron Sponge & Governor Co., Elizabeth, New Jersey 140
Coxhead Corp., Ralph C., New York, N. Y..... 638
Crane Co., Chicago, Ill. 402, 403
Cribben & Sexton Co., Chicago, Ill. 316, 317
Cruse-Kemper Co., Ambler, Pa. 205
Cutler-Hammer Inc., Milwaukee, Wis. 327
Crouse-Hinds Co., Syracuse, N. Y. 123
Davey Compressor Co., Kent, Ohio.....635, 636
Dearborn Chemical Co., Chicago, Ill. 300
Detroit Lubricator Co., Detroit, Mich. 127
Detroit-Michigan Stove Co., Detroit, Mich. ..319 to 321
Dresser Mfg. Co., S. R., Bradford, Pa. 421, 422
Dur-O-Lite Pencil Co., Clifton Heights, Pa. ..640, 641
Economy Governor Co., Anderson, Ind. 527
Electrolux Refrigerator Sales Inc., New York, N. Y. .....Stage
Elliott Addressing Machine Co., Cambridge, Mass. 600
Ensign-Reynolds Inc., New York, N. Y. 520
Estate Stove Co., Hamilton, Ohio.....416 to 511
Felt & Tarrant Mfg. Co., Chicago, Ill. 602
Fagan-Andrews Co., Milwaukee, Wis. 116
Floyd-Wells Co., Royersford, Pa. 510
Fisher-Governor Co., Marshalltown, Iowa..... 109
Gas Purifying Materials Co. Inc., Long Island City, N. Y. 528
General Ceramics Co., New York, N. Y. 119
General Coal Co., Philadelphia, Pa. 137
General Electric Co., New York, N. Y. 515; 616
General Gas Light Co., Kalamazoo, Mich. ...523 to 608
Glenwood Range Co., Taunton, Mass. 220, 221
Globe American Corp., Kokomo, Ind. .....214 to 216
Handley Brown Heater Co., Jackson, Mich. 210
Harper Wyman Mfg. Co., Chicago, Ill. 521
Homestead Heater Co., Newark, N. J. 120, 121
Imperial Brass Mfg. Co., Chicago, Ill. 614
Improved Equipment-Russell Engineering Corp., New York, N. Y. 230
International Business Machines Corp., New York, N. Y. 427, 500
International Nickel Co. Inc., New York, N. Y. ..111-B
Johns-Manville, Inc., New York, N. Y. 630, 631
Kitson Co., Philadelphia, Pa. 637
Leeds & Northrup Co., Philadelphia, Pa. 103
Lambert Meter Co., Brooklyn, N. Y. 229
Lattimer-Stevens Co., Columbus, Ohio..... 203
Lavino & Co., E. J., Philadelphia, Pa. 306
Lindemann & Hoverson Co., A. J., Milwaukee, Wisconsin 410
Lovekin Water Heater Co., Philadelphia, Pa. 418
Mercoid Corp., Chicago, Ill. 606
Majestic Mfg. Co., St. Louis, Mo. 117, 118
McWane Cast Iron Pipe Co., Birmingham, Ala... 139
Mears-Kane-Ofeldt Inc., Philadelphia, Pa. 617
Mettler Co., Lee B., Los Angeles, Calif. 209
Milwaukee Gas Specialty Co., Milwaukee, Wis .. 211
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. 413, 414
Moore Corp., Joliet, Ill. 411
Mueller Co., Decatur, Ill. 301
Mulcare Engineering Co. Inc., New York, N. Y. 528
Moore Valve Co., J. W., Everett, Mass. 124
Merco-Nordstrom Valve Co., Pittsburgh, Pa. ..228, 303
National Cash Register Co., Dayton, Ohio..... 501
National Radiator Corp., Johnstown, Pa. 131
National Superior Co., Toledo, Ohio..... 605
National Tube Co., Pittsburgh, Pa. .....200 to 202
Patrol Valve Co., Cleveland, Ohio..... 310
Peerless Heater Co., Boyertown, Pa. 624
Peerless Mfg. Corp., Louisville, Ky. 133
Penn Electric Switch Co., Des Moines, Iowa.... 522
Pennsylvania Furnace & Iron Co., Warren, Pa. .. 208
Pittsburgh Coal Co., Pittsburgh, Pa. 504
Pittsburgh Equitable Meter Co., Pittsburgh, Pa. 228, 303
Pittsburgh Water Heater Co., Pittsburgh, Pa. 128, 129
Public Utilities Reports Inc., Washington, D. C... 633
Republic Steel Co., Youngstown, Ohio..... 107
Ridge Tool Co., Elyria, Ohio..... 14[illegible]
Remington Rand Inc., Buffalo, N. Y. .....529 to 531
Reynolds Gas Regulator Co., Anderson, Ind. ..322, 323
Robbins Publishing Co., New York, N. Y. 231
Roberts & Mander Stove Co., Philadelphia, Pa. 222, 223
Roberts Brass Mfg. Co., Detroit, Mich. 507
Roberts-Gordon Appliance Corp., Buffalo, N. Y. 624
Robertshaw Thermostat Co., Youngwood, Pa. 512
Roper Corp., Geo. D., Rockford, Ill. 315, 412
Ruud Manufacturing Co., Pittsburgh, Pa. ....224 to 309
Reliance Regulator Corp., Alhambra, Calif. 400, 401
Roots-Connersville Blower Corp., Connersville, Indiana 405
Schoenberger Co., W. J., Cleveland, Ohio....612, 613
Safety Gas Main Stopper Co. Inc., Brooklyn, N. Y. 105
Sands Mfg. Co., Cleveland, Ohio..... 213
Semet-Solvay Engineering Corp., New York, N. Y. 226
Skinner Co., M. B., South Bend, Ind. 110
Smith Mfg. Co., The A. P., East Orange, N. J. .. 143
Spencer Thermostat Co., Attleboro, Mass. 136
Sprague Meter Co., Bridgeport, Conn. 423
Stacey Bros. Gas Construction Co., New York, N. Y. 404, 405

Standard Gas Equipment Corp., New York, N. Y. 217 to 219
Superior Meter Co., Brooklyn, N. Y. 305
Surface Combustion Corp., Toledo, Ohio....312 to 314
Tappan Stove Co., Mansfield, Ohio..... 508
Therminsul Corporation of America, Kalamazoo, Michigan 212
Thrush & Co., H. A., Peru, Indiana..... 115
Tinnerman Stove & Range Co., Cleveland, Ohio.. 609
United American Bosch Corp., Springfield, Mass. 415
United Engineers & Constructors Inc., Philadelphia, Pa. 304
United States Bureau of Standards, Washington, District of Columbia 625, 626
United States Pipe & Foundry Co., Burlington, New Jersey..... 206
Wailes Dove-Hermiston Corp., New York, N. Y. 526
Watts Regulator Co., Lawrence, Mass. 122
Welsbach Co., Gloucester, N. J. .....112 to 114
Western Gas Construction Co., Fort Wayne, Ind. 324
Whitehead Metal Products Co. of N. Y., New York, N. Y. 111-A
Wood Mfg. Co., John, Conshohocken, Pa. 513, 514
Wilcolator Co., Newark, New Jersey..... 207
Wood Co., R. D., Philadelphia, Pa. 302
Youngstown Sheet & Tube Co., Youngstown, Ohio 132

High Pressure Storage

(*Continued from page* 21)

specific information is available indicating the reasonableness of such extension.

Storage ought not to be installed until absolutely necessary and then the quantity should be a minimum consistent with the size which will provide the least cost per thousand available storage over a long term period.

Some favor determining storage from the average daily send out and assume 40% to 75% of the average daily send out as a sufficient quantity. The use of this method is more desirable as a check on the quantity as found by more detailed investigation of all factors affecting the size of storage than as the direct means of determining storage capacity.

(*Continued in November issue*)

Eliminating Nitric Acid From Revivified Sponge

(*Continued from page* 28)

For the determination of NO we used the method described by Mr. W. H. Fulweiler in his discussion of the gum problem before the American Gas Association in 1933. (A. G. A. Proceedings, 1933, Pages 829-846.) Some very minor changes were made in the apparatus which did not in any way effect the method. Photographs of the apparatus are attached.

As a result of the experiments listed above, it is our opinion that the simplest method of re-using revivified sponge is to blow it with air and steam at a relatively high temperature, depending upon the conditions at the plant, until the air leaving the box containing the revivified sponge contains such a small concentration of NO that the vapor phase gums due to its presence will not materially effect the action of small orifices. Other methods may be developed from the results of these experiments.

In the experimental work the gas was divided into two portions which were analyzed simultaneously. One portion was analyzed in the control equipment and other portion was analyzed after the treatment described in remarks. The NO results are reported in grams per million cubic feet of gas. The first test was run to calibrate the boards.

In addition to the several papers mentioned, reference should be made to "A Comprehensive Treatise on Inorganic and Theoretical Chemistry" by J. W. Mellor, Vol. VIII, pages 417 to 449.

Comparative Fuel Consumption Tests

(*Continued from page* 17)

Plain Cookies

Constant Factors: Baking sheets: 10¾ x 15¾ inches, tin.
Number of cookies: 15 on each sheet.
Temperature: 375 degrees.

		MAGIC CHEF			GENERAL ELECTRIC		
Date	Number of Sheets	Time (Minutes)	Bake Cu. ft.	Btu.	Time (Minutes)	Bake Kw-hr.	Btu.
9-26-33	2	15	2.64	2753.52	15	.22	750.64
9-27-33	2	15	2.68	2795.24	15	.30	1023.6
9-28-33	2	15	2.56	2670.08	15	.29	989.48
10-2-33	2	13	2.30	2398.9	13	.22	750.64
			10.18	10617.74		1.03	3514.36
	Averages:		2.545	2654.435		.2575	878.590
9-26-33	1	15	2.48	2586.64	15	.18	614.16
9-26-33	1	15	2.17	2263.31	15	.12	409.44
9-27-33	1	15	2.40	2503.2	15	.13	443.56
9-27-33	1	15	2.22	2315.46	15	.16	545.92
9-28-33	1	15	2.40	2503.2	15	.16	545.92
9-28-33	1	15	2.30	2398.9	15	.17	580.04
10-2-33	1	13	2.09	2179.87	13	.11	375.32
10-2-33	1	13	2.03	2117.29	13	.16	545.92
			18.09	18867.87		1.19	4060.28
	Averages:		2.261	2358.483		.148	507.535

Sunshine Cake

Constant Factors: Time and temperature: 325 degrees for 1 hour.
Pan used: 9½-inch aluminum tube pan.

	MAGIC CHEF					GENERAL ELECTRIC				
	Preheat					Preheat				
Date	Time (Min.)	Cons. Cu. ft	Bake Cu. ft.	Total Cu. ft.	Total Btu.	Time (Min.)	Cons. Kw-hr.	Bake Kw-hr.	Total Kw.-hr.	Total Btu.
5-15-33	12	3.85	7.31	11.16	11639.88	13	.64	.53	1.17	3992.04
7- 7-33	10½	3.51	6.04	9.55	9960.65	11	.53	.29	.82	2797.84
7-10-33	12	3.58	6.56	10.14	10576.02	12	.59	.37	.96	3275.52
				30.85	32176.55				2.95	10065.40
			Averages:	10.283	10725.516				.983	3355.133

It's Not Your Job to Experiment

REYNOLDS Gas Regulators are proved products. They have 40 and more years of successful operation in a field that is outstanding for its rigid requirements. And as the Gas Industry has progressed to meet modern demands, Reynolds has paced the field in the development of Gas Control Equipment that will give satisfactory control limits, capacity range and economic operation over a long period of time.

Attention! Reynolds Gas Regulator Company's **A. G. A. Convention Display**

☆ Atlantic City, New Jersey
October 29 to November 3
Booth No. 322-323

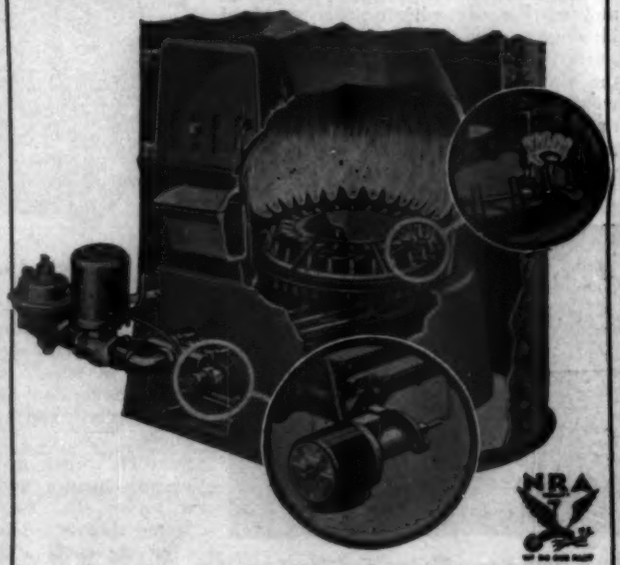
Reynolds Branch Offices: 421 Dwight Bldg., Kansas City, Mo.; 2nd Unit, Santa Fe Bldg., Dallas, Texas.
Representatives: Eastern Appliance Co., Boston, Mass.; F. E. Newberry, Avon, N. J.; G. H. Unekefer, 428 Boyd St., Los Angeles, Calif.

● *If It's a Gas Control Problem Write*

Reynolds Gas Regulator Co.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

BARBER
Automatic Jet Gas BURNERS
for
Warm Air Furnaces
and
Steam and Hot Water Boilers



Illustrating a No. 324-B Barber Automatic Burner installed in a round combustion chamber. Note the proper position of the burner; its simplicity of installation and the excellent heat-producing scrubbing action of the flame.

Barber Conversion Burners are supplied with the Spencer Klixon No. C-1888 Safety Pilot Control, which is backed by years of research and development. It is a positive and accurate device. Ignition of the Barber Burner Units is made within one minute and the complete shut-off in the event of gas or current failure is made within two minutes.

There is none better than the Barber Automatic Gas Burner and Barber Pressure Regulator for warm air furnace Gas Conversion jobs, nor for standard burner equipment for new furnaces, boilers and appliances.

Barber's line of gas burners includes specially designed equipment for warm air heating and air conditioning systems. Make it your answer to the new-day demand for completely automatic heat.

Write at once for full information—NEW CATALOG and latest ATTRACTIVE DISCOUNTS, SELLING CO-OPERATION, ENGINEERING CO-OPERATION in specifying proper arrangement of Barber Burner Assemblies for your particular requirements.

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, Ohio

EQUIPMENT NEWS

A New Era in Pipe Welding

The introduction about three years ago of the Lindeweld process wrought many changes in pipe line welding practices due to the speed and economy of this new method. A new piece of equipment and corresponding new technique as refinements of this process is announced.

The new multi-flame Lindewelding head consists of a chromium-plated stem and tip for use with certain standard blowpipes. Its design is a radical departure from previous styles in that the tip provides three flames: a main welding flame in the usual position, and two smaller auxiliary flames so positioned as to preheat both edges of the vee ahead of the advancing puddle.

Multi-flame Lindwelding Head.

The chief modification brought about by the multi-flame head is a lengthening of the stroke to insure even preheating of the vee by the auxiliary flames and an even and more rapid compensatory melting of the special Lindewelding rod.

This new development has already been thoroughly tested in the mid-continent region, where several hundred miles of pipe of various diameters have been laid down using the multi-flame head. Results have shown that speeds better by one-third or more over those customary with single-flame Lindewelding are attained.

The nature of multi-flame Lindewelding practically restricts it to rotation welding, but it has already been used in the fabrication of bull plugs, headers and reducers for power plant piping, and other uses may be developed in the future. Its chief field of application will, of course, continue to be overland pipe welding, where its superiority may be expected to place it ahead of all older methods.

The Burdett Conversion Burner

Burdett Manufacturing Co., 19 No. Shelton St., Chicago, Ill., recently issued a phamplet titled, "Radiant Heat," in which is described the Burdett Conversion burners for industrial, commercial and domestic use. The burner head is a refractory disc. The mixture comes up through the center of the burner and is ignited just as it leaves the disc. The flame is projected downward in a scouring motion over the surface of the disc. The refractory surface becomes radiant in 30 seconds, and this in turn helps to consume the mixture. The burner discs are made in sizes ranging from 3 inches to 18 inches in diameter. They burn either manufactured or natural gas without changing the burner orifice. Copy of phamplet will be mailed on request.

Burdett Burner showing Refractory Disc.

Fall and Winter Replacement Sales Campaign

Investigations indicate clearly that there is a large market available to gas companies for the sale of controls and accessories to modernize heating plants.

One of the best ways to get at this market is through the offer of a free inspection which will in no wise obligate the user but which will give your salesmen an opportunity to make constructive suggestions, many of which will result in orders. Individual companies who have carried on such campaigns have produced a considerable extra revenue which in addition to bringing the company very desirable profits will serve to keep at least the sales and service men together.

Such a replacement sales campaign is especially timely this fall in view of the tremendous activity resulting from and built upon the Federal Housing Act. All over the country, in cities of every size, local committees are carrying forward aggressive advertising and promotion campaigns to stimulate interest in modernizing to save property from depreciation, to improve the appearance, to increase values and to provide work for the hundreds of thousands of people connected directly or indirectly with the building industry. All of this publicity will help you to make a replacement sales campaign of your own produce a good volume of profitable sales.

To further assist in the development of this business Minneapolis-Honeywell Regulator Company have prepared and are now running a powerful national advertising campaign. It consists of full pages and smaller space in a group of the more important national magazines which reach millions of readers, and in fifteen large metropolitan newspapers. This advertising emphasizes the need for bringing installations up-to-date.

New Inert Gas Producer Bulletin

Bulletin 100-B12, illustrating and describing the Harrison Inert Gas Producer, has just been issued by Roots-Connersville Blower Corp. of Connersville, Ind., who are sole licensees under the Harrison patent issued Jan. 17, 1933.

These units are built to produce inert gas containing less than 1% oxygen and zero per cent carbon monoxide when operating on manufactured or natural gas, or fuel oil.

Air and gas are delivered separately to a water-cooled combustion chamber where the gas burns, forming the inert gas, which is discharged through a cooler to bring its temperature down to a useable point. The drive unit can be either a gas or gasoline engine, or an electric motor. Illustrations of the various types already supplied are shown in the bulletin.

R-C Harrison Inert Gas Producers have been built in sizes ranging from 7,500 to 40,000 cu. ft. of inerts per hour, measured at 60° F., against a pressure of 2 lbs.

SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs

SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

Modern Carbonizing Systems

GLOVER-WEST
CONTINUOUS VERTICAL RETORTS

in service at 225 gas plants whose yearly outputs range from 6 to 8000 millions. The logical plant for maximum gas yields.

•

GLOVER-WEST
SEMI-INTERMITTENT VERTICALS

As an alternative where a demand for coke of a special character must be met.

Designed, Manufactured and Erected by

WEST GAS IMPROVEMENT COMPANY
424 MADISON AVENUE
NEW YORK CITY

NEWS of the GAS INDUSTRY

Central Indiana Gas Co. Has New Officers

H. Carl Wolf, former Vice-President of the Consolidated Electric and Gas Co., New York, N. Y., has assumed the management of the Central Indiana Gas Co. at Muncie, Ind., with the office of President and a membership on the board of directors.

E. A. Angley, Vice-President, who has been in charge of the local property and its associated companies in Indiana, has resigned and will leave soon for southern Michigan, where he will make his home. R. C. Beebe, who has been a director in the company and has served as manager of operations here, also has resigned and will go to Sayre, Pa., where he will have charge of gas properties. H. W. Thornburg, manager of the Anderson, Ind., division of the company, has been elected to the board of directors.

Mr. Wolf was chief engineer of the Public Service Commission of Maryland for eight years, serving two years prior to that with the Illinois Public Service Commission.

Merger Approved

The merging of the West Side Natural Gas Company and the Natural Gas Corporation of California was approved by the State Railroad Commission. The Public Service Company owns the stock of the West Side concern and the Natural Gas Properties, Inc., own the stock of the Natural Gas Corporation, and the Public Service own the Properties, Inc. The merging will result in unification of stock, simplified accounting, reduce taxes and operating costs. The agreement calls for the absorption of West Side by Natural Gas Corporation. Natural Gas Corporation of California furnishes gas in Arcata, Brawley, Calexico, Dunsmuir, El Centro, Suisun, Fairfield, Isleton, Rio Vista, Yreka and Vacaville. The West Side company serves Taft, South Taft, Ford City, Avenal, Mariposa, Fellows and Kettleman City.

Connecticut Lt. & Power Has New Volume Rate

The Connecticut Light & Power Co., the largest of whose several gas properties is located in Waterbury, has announced a new rate schedule, designated as Rate 21, for large users. Customers may use Rate 21 or Rate 20, the old basis, according to their desire, it is stated.

Under Rate 21 the consumer pays $2.90 for the first 1,500 cu. ft., and 75 cents for M thereafter. Rate 20 calls for a basis of 90 cents for the first 300 ft., $1.30 for the next M, and 95 cents for M thereafter. In each case the minimum charge is the basic amount for the first designated number of units, $2.29 and 90 cents.

The two rates converge at 4,050 cu ft., and after that point Rate 21 offers a definite saving. Consumers who have customarily been using more than 4,050 cu. ft. have been shifted to Rate 21, but with the understanding that if a few months' experience does not show a saving, they may resume the old schedule.

Ala. Utilities Service Co. To Eliminate Low Pressure Areas in Distribution System

Morris White, Montgomery, manager of the Alabama Utilities Service Company, September 10 announced plans for a $7,000 expenditure to eliminate the last of the low pressure areas in its distribution system. The project involves the laying of a six-inch high pressure main east from the company's north and south main to a booster station to be erected on Buford Street.

New Equipment Installed at Ludington, Mich.

Among recent extensions and improvements made by the Gas Corporation of Michigan at their Ludington, Michigan plant is a new coal gas bench, installed by the Improved Equipment-Russell Engineering Corporation of New York. This is a rear cleaning stop-end bench of sixes, equipped with "The Doherty Bench Fuel Economizer" and scrubber standpipes. This company also put in several blocks of distribution lines.

Gas Company Home Service Heads Get Electrolux Health Booklet

Various ways in which an Electrolux refrigerator can be used in the home as an aid in promoting and preserving health from babyhood on, or as a help in time of sickness, are described in a booklet prepared for distribution by the home service departments of gas companies.

The booklet, entitled, "Cold Facts About Health," was prepared under the direction of Jane Tiffany Wagner, head of the Home Service Department of Electrolux Refrigerator Sales, Inc., at 51 East 42nd Street, New York City. Miss Wagner, an authority on home economics, co-operates with the heads of home service departments of gas companies by furnishing the latest information on household refrigeration.

Convention Calendar

October

1-5 National Metal Exposition, Commerce Hall, New York, N. Y.

5-6 Empire State Gas and Electric Association annual meeting, Westchester Country Club, Rye, N. Y.

Week of 29th—American Gas Association 16th annual convention, Atlantic City, N. J. Alexander Forward, managing director.

June, 1935

10-11 Canadian Gas Association, annual convention, Quebec, George W. Allen, Secretary, 21 Astley Avenue, Toronto, Canada.

Appointed to A. G. A. Fellowship at W. Va. University

Announcement has been made of the appointment of Robert I. Snyder to the Natural Gas Fellowship at the University of West Virginia. Mr. Snyder graduated in mechanical engineering at the University of Michigan in 1932. His practical experience includes seven months with the Childers Drilling and Producing Company near Farmington, New Mexico, on oil and gas well drilling operations and a summer's employment with the Wayne County Road Commission near Detroit, Michigan.

Since his graduation from the University of Michigan, Mr. Snyder has been employed ten months with the Johns Manville Home Insulation Contractor in Detroit and, in addition, has worked ten months in the research department of the American Gas Association Testing Laboratory in Cleveland, Ohio. At the present time he is employed in the industrial gas research section of the A. G. A. Testing Laboratory.

Mr. Snyder is the son of A. I. Snyder, engineer of the Detroit City Gas Company, Detroit, Mich., who is a prominent member of the gas fraternity.

Safety Record

Employees of the Elizabeth Street Shop of the Consolidated Gas Company of New York have the distinction of establishing a safety record of seven years' continuous operation without an accident involving loss of time from work.

This department, with an average of 150 employees, holds the safety record of the Consolidated Gas Company. It has in its possession a bronze plaque, with suitably engraved bars for each year of operation without accident. The Ravenswood gas manufacturing plant, in Long Island City, is second to the

STANDARDIZE

on

SPRAGUE
CAST IRON GAS METERS
and
REGULATORS

for

low, medium, and high pressures

Accurate in Measurement.
Economical in Service.

THE SPRAGUE METER CO.

BRIDGEPORT, CONN.

Gas Stops

of True Quality
...by KITSON

[All Types
All Sizes]

G-101 Flat Head "Special"

G-115 Lock Wing "Special"

GROUND KEY GAS STOPS of Standard, Extra, Special or Heavy Service Types—with Flat Heads, Square Heads, Lock Wings, Lever Handles, etc.—all Brass Stops or Iron Body Stops with Brass Plugs—they're all made by Kitson (and have been for years).

You take no chances when you purchase Kitson Products, for they're "guaranteed" as to MATERIAL and WORKMANSHIP.

"Insist upon the old reliable name, KITSON."

Literature and Prices on request.

KITSON CO.
WESTMORELAND & STOKLEY STS.
PHILADELPHIA PA.

"Since 1891"

"WE USE CHACE THERMOSTATIC BIMETAL IN MANY OF OUR CONTROLS"

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

Chace Thermostatic Bimetal is the active element used to provide various protective features in automatically fired burners, to control the temperature in furnaces and to regulate action of automatic heating equipment. Fans are started and stopped, drafts opened and closed, fuel supply regulated with Chace Bimetal.

Sold in Sheets, Strips and in Shapes formed to your specifications.

W. M. CHACE VALVE CO.

Elizabeth Street Shop, with a total of five years without accident.

The Safety Bureau announced that the Elizabeth Street Shop had worked, in the seven-year period, a total of 2,317,000 man-hours without a lost-time accident. This is the equivalent of one man working eight hours a day, five days a week, for 1,109 years and 156 days.

The seven-year record of the Elizabeth Street Shop is believed to be without precedent in the utility industry.

Enlarging Natural Gas Absorption Plant

Construction is well under way on what is to be the largest natural gasoline absorption plant in the Lone Star system in Texas.

When completed the Brooks Plant, Breckenridge, Texas, will be one of the largest natural gasoline absorption plants in Texas and the largest operated by Lone Star Gasoline Co.

It is to have 23 compressor units, three auxiliary power engines, and is to provide permanent employment for additional men.

Total daily capacity of the plant is being increased from 10 million to 16 million cubic feet of gas and 30,000 gallons of gasoline.

Men, instead of machines, are being used for ditching and excavating so that a greater number of persons might be employed, it has been explained by Lone Star officials. Two carloads of cement, eight carloads of gravel, 100 pounds of dynamite, two tons of carbide, a half ton of welding rods and large quantities of other supplies have been necessary on the construction job.

Protect Your
Industrial Installations.
The
"LOW WATER GAS
CUT-OFF"

¾"
1"
1¼"
1½"
2"
2½"
3"
3½"
4"

P. M. LATTNER MFG. COMPANY
CEDAR RAPIDS, IOWA

More than five miles of 8-inch and 16-inch pipe lines, 23,000 feet, already have been used.

Installation of six large compressor engines and construction of a building in which to house them has been supervised by S. W. Taft of Eastland, construction engineer for the system's compressor department.

To Build Gas Line

The Lone Star Gas Company, Dallas, Texas, is arranging to build a 75-mile natural gas pipe line from Anderson county, Texas, to connect with its main line near Waco. The pipe will be twelve inches and the line will cost about $900,000. It will be in service early in December.

Empire G. & E. Begins Natural Gas Service

The Empire Gas and Electric Co., Buffalo, N. Y., began serving natural gas to its customers in Lyons, N. Y., on August 29.

Gas Revenues Continue Gains

For the five months ending May 31 manufactured and natural gas revenues aggregated $326,326,400, an increase of 3.1 per cent over the corresponding period of 1933, it was announced by Paul Ryan, Chief Statistican of the American Gas Association. Revenues from domestic customers were practically unchanged. Revenues from industrial and commercial users however increased more than 15 per cent over the first five months of 1933.

For the month of May 1934 manufactured and natural gas revenues aggregated $56,483,100, as compared with $55,420,200 in May 1933, an increase of 1.9 per cent.

Revenues from gas sales to industrial-commercial users registered a pronounced upturn, aggregating $15,162,400 in May, an increase of nearly 17 per cent over the same month a year ago.

Revenues from sales for domestic uses, such as, cooking, water-heating, refrigeration, etc. were still 2.6 per cent below May 1933.

Manufactured gas industry revenues in May totalled $32,312,900, practically the same as for the corresponding month a year ago. Revenues from industrial and commercial users of manufactured gas gained 5.6 per cent. Revenues from domestic uses were down 1.8 per cent.

A somewhat similar situation was reflected in the reports of the natural gas companies. Total revenues in May amounted to $24,170,200, a gain of 3.9 per cent over a year ago. Revenues from industrial uses aggregated $7,632,100, representing an increase of nearly 35 per cent. Revenues from domestic users of natural gas however registered a loss of 6.3 per cent.

Personals

Walter C. Beckjord, formerly Vice-President and General Manager of the Boston Consolidated Gas Co., has been elected Vice-President and General Manager of the Columbia Gas & Electric Corp.

Mr. Beckjord was graduated in 1909 from the University of Minnesota, having worked during summer vacations as cadet engineer for the St. Paul Gas

Light Co. After graduation he became construction engineer for the St. Paul utility, and left in 1916 to become assistant engineer for the American Light & Traction Co. In 1922 he was elected Vice-President and chief engineer of the latter company. He became Vice-President and general manager of the Boston Consolidated Gas Co. in 1929, resigning late last month to accept the Columbia position.

In addition to Mr. Beckjord, the following executive officers were elected as directors: Edward Reynolds, Jr., Executive Vice-President of Columbia; C. I. Weaver, Vice-President of Columbia, and President of the Columbia Engineering Corp. and the subsidiaries of the Columbia System operated from the Columbus office; and Frank M. Tait, President of the Dayton Power and Light Co.

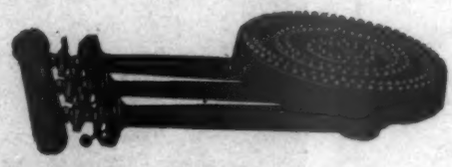
Mr. E. M. Farnsworth, Jr., has been elected Vice-President of Boston Consolidated Gas Co.

Mr. Farnsworth has been President of the Old Colony Gas Co., of Braintree, Mass., since 1929, having previously held the position of Vice-President and Treasurer. His experience in the gas field began in 1917 when the reorganization of the Old Colony Gas Co. took place. He is a graduate of Harvard, receiving his engineering degree in 1907.

James A. Cook, for nine years general superintendent of the Lynn Gas & Electric Co., Lynn, Mass., has been appointed general manager, succeeding the late Charles R. Prichard.

JOHNSON

60 BCE RING BURNERS PRODUCE HIGH FLAME TEMPERATURE



Johnson Ring Burners are equipped with the famous Johnson Patented Direct Jet Regulator which makes an absolute gas adjustment and delivers the gas into the burners under greater jet velocity. This, combined with the special Venturi Tubes and air adjustment, produce a high flame temperature. 60 BCE Ring Burners are made up of three independent burners which may be used singly, in pairs, or in triple. Write for full details.

JOHNSON GAS APPLIANCE Co.
Cedar Rapids IOWA

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

METER REPAIR PARTS

FOR

ALL MAKES - ALL SIZES OF METERS

LARGEST GAS COMPANIES NOW USING OUR PARTS

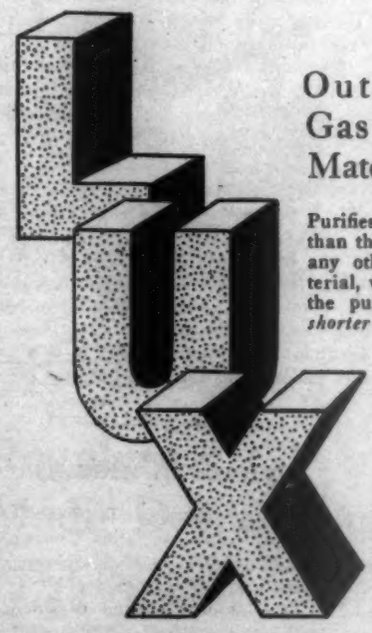
SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

SAMPLES AND PRICES GLADLY SENT

—•—

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.



The Outstanding Gas Purifying Material » » »

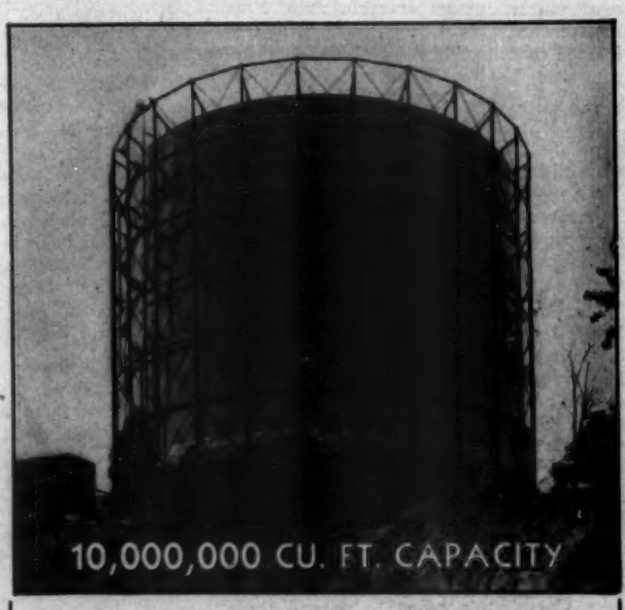
Purifies *much more* gas than the same quantity of any other purifying material, while it also effects the purification in much *shorter time.*

Write for interesting booklet

THE ALPHA-LUX COMPANY, Inc.

192 Front St., New York

Philadelphia **Chicago**



HIGH PRESSURE **GAS HOLDERS** LOW PRESSURE

PURIFIERS · TANKS · CONDENSERS

STEEL PLATE CONSTRUCTION

INTEGRITY GOOD WORKMANSHIP FAIR DEALING

CRUSE-KEMPER CO.

AMBLER, PA.

Wilmer K. Allebach has been appointed superintendent of the Camden Coke plant of the Public Service Gas & Electric Co., Newark, N. J. He has been with the coke plant since December, 1914, having started as a draftsman.

Percy H. Winch was appointed assistant superintendent at same time. Mr. Winch started in the gas distribution department, Hudson Division, in 1923. Later he was assigned to the West End Gas Works, Jersey City, then the Harrison Gas Works, and in 1932 was transferred to the Camden Coke plant.

Malcolm M. Graham, Assistant Treasurer of the Consolidated Gas Company of New York, on September 12th celebrated his fiftieth anniversary with the Company and its affiliated and predecessor companies. He was employed as an office boy by the Equitable Gas Light Company on September 12, 1884.

He is the first officer of the Consolidated Gas Company to achieve a fifty-year service record.

Mr. Graham was the guest of honor at a dinner at the University Club given by his business associates in the Consolidated Gas Company and its affiliated companies. President Geo. B. Cortelyou acted as toastmaster.

Lighting was the chief use of gas when Mr. Graham entered the gas business. He was soon promoted to other positions, such as ledger clerk, application clerk and cashier. In 1898 he was made assistant secretary of the New Amsterdam Gas Company, which was formed to consolidate the Equitable Company and the New York and East River Gas Company.

On March 4, 1924, Mr. Graham was appointed Assistant Treasurer of the Consolidated Gas Company of New York. At present he is also Assistant Treasurer of the Astoria Light, Heat and Power Company, and Assistant Treasurer of the Standard Gas Light Company of the City of New York.

Mr. Graham was born in Flushing, Long Island, on February 5, 1867, and has lived there all his life. He attended Flushing Institute. During his business career he has worked for only two concerns. On September 1, 1883, he started to work as office boy to the traffic manager of the West Shore Railroad, and a year later he joined the gas company.

On the morning of Mr. Graham's anniversary, the officers of the Consolidated Gas Company assembled in President Cortelyou's office to extend their official greetings to him and to congratulate him upon his long and eventful business career.

Howard B. Hall, new-business manager and secretary of the Old Colony Gas Co., East Braintree, Mass., has been appointed President of the company.

Mr. Hall, a graduate of Northeastern University, came with the Old Colony company in 1914 as an employee of the accounting department.

Mr. J. T. Self has been appointed manager of the Montgomery Gas Co., Montgomery, W. Va., succeeding B. F. Rinehart. Mr. Self will have charge of the company operations in and around Montgomery.

Obituary

EDWARD J. BRADY

Edward J. Brady, manager of the U. G. I's Physical Laboratory, Philadelphia, Pa., was drowned on September 8th in the Morro Castle disaster. He was 54 years of age.

Twenty five years ago Mr. Brady joined the U. G. I. Company as Laboratory Assistant under the guidance of the late Charles O. Bond.

Over the years, the "Laboratory" became truly his "length and shadow." To each problem he gave the same intensive thought.

A year under his patient and able training was the equivalent of a graduate course in pure and applied physics.

E. J. Brady was a true scientist but with it he never overlooked the Company's business.

It was because he had the ability to combine his academic thinking with practical industrial problems that he served his Company so well. He invented and designed the "Brady B. t. u. Indicator," a device that has been sold by the U. G. I. Company to gas plants throughout the world. The Gas Industry recognized his contribution by presenting him with the Beal gold medal in 1919. The methods used by the laboratory in testing gas oils and high temperature refractories were his. In fact, there were scores of valuable kinks and improvements that could be added to his credit.

He was a member of a dozen technical and engineering societies and kept well informed of their activities. Perhaps the Physics Club of Philadelphia was his favorite. He knew the members of this organization intimately and enjoyed their respect.

He is survived by his wife and daughter, who were also on board, the Morro Castle.

WILLIAM J. WELSH

Mr. William J. Welsh, President of the New York and Richmond Gas Company, the Staten Island Savings Bank, and the Society of Gas Lighting, died at his home, 104 Duncan Road, Grymes Hill, Staten Island, on Saturday, September 8th after four days' illness. The cause of death was a heart condition known to medical science as conorary embolism.

William J. Welsh

Mr. Welsh, who was widely known in gas company and banking circles throughout the United States, was born on January 26, 1875 in Clifton, Staten Island. He had lived on Staten Island all his life. He received his education at Public School 14 at Stapleton and at Cooper Union Institute in Manhattan, where he took a course offered by the American Gas Light Association. At the age of 15 he became a mechanic in the Gas Company of which his father, William Sr. was general superintendent. Mr. Welsh's oldest son, Joseph J., now Superintendent of Production in the Plant of the New York and Richmond Gas Company, representing the third generation of the Welsh family to be associated with the Gas Industry on Staten Island.

Through a series of rapid promotions, in 1901 Mr. Welsh was placed in charge of the use of gas for domestic and industrial purposes. In 1903 he was promoted to General Superintendent, succeeding his father, who retired. In 1903 Mr. Welsh was made Vice President and in 1912 elected President of the Company. From 1929 until his death Mr. Welsh was Treasurer of the American Gas Association. He was the first two-term President of the Empire State Gas and Electric Association, serving in that capacity in 1929 and 1930.

RICHARD T. HIGGINS

Richard T. Higgins, chairman of the Connecticut Public Utilities Commission since its establishment 23 years ago, died Sept. 16. He was 68 years old.

Mr. Higgins was elected president of the National Association of Railroad and Utility Commissioners last year.

Mr. Higgins was twice married. His first wife, Marguerite Bryan, of Winsted, died in 1920, and Mr. Higgins moved to Hartford. July 3, 1923, he married Margaret J. Noonan, of Hartford, who survives.

HEATING BUNKER "C" OIL

for carburetting gas requires high pressure and high temperature.

ANDALE BOWED TUBE HEATERS

remain tight and are easily cleaned. These are the requirements for continuous satisfactory operation.

ANDALE COMPANY

1600 ARCH STREET

PHILADELPHIA

VISIT OUR EXHIBIT

at

BOOTH 226

American Gas Association

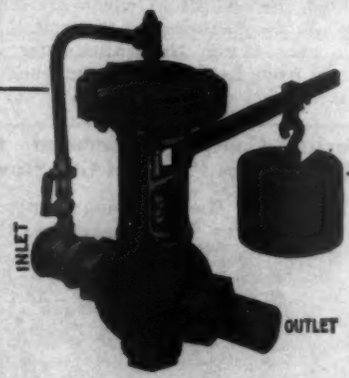
Convention

SEMET-SOLVAY

ENGINEERING CORPORATION

Engineers ▾ ***Contractors***

40 RECTOR ST. ▾ NEW YORK, N. Y.



C-F COMPRESSOR REGULATOR

Speed Pump

Regulation Made Definite and Sure

EXCESS discharge pressure is relieved, discharge kept constant, and operation of the compressor at full speed made safe, by use of the C-F Compressor Regulator. As a close regulator of pressure on electric-driven pumps, it stands unrivalled. Gas, steam, air, water—in all such applications the C-F. Compressor Regulator is thoroughly dependable. The lever type is here shown. A spring-loaded valve is also available and is equally sure in operation. Excess discharge pressure flows through without noticeable variation in suction line. Ask for descriptive pamphlet, also catalog of Chaplin-Fulton regulators for all requirements of gas-pressure control.

THE CHAPLIN-FULTON MFG. COMPANY

28-40 Penn Avenue Pittsburgh, Pa.

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of

Standard Gas and Electric Company

231 South La Salle Street, Chicago

New York Pittsburgh San Francisco

TRADE NEWS

Wants So. American Agency

Mr. Leon de Grand Pré, formerly a partner in the firm of T. C. de Grand Pré & Brother, manufacturers' representatives of Argentine, is expected to arrive in New York soon from Buenos Aires.

Mr. de Grand Pré is interested in obtaining American representations of popular priced stoves and plates for ordinary gas, mantles and also in all products for propane gas, for South America and other continents and can be reached care of the JOURNAL office.

U. S. Rubber Products, Inc. Appoint Manager for St. Louis District

H. A. Everlien, Sales Manager, Mechanical Goods Division, U. S. Rubber Products, Inc., today announced the appointment of H. S. McPherson as Manager of Mechanical Sales in the St. Louis District. Mr. McPherson, who has been with the company for over fifteen years, was formerly in charge of Mechanical Sales in the Boston District. Prior to that he held important posts in the Export Department in Australia, South America and the Far East.

W. G. Mueller, who has enjoyed for more than twenty-five years an interesting and successful record as a salesman with the company, largely in the Connecticut territory, has been promoted to be manager of Mechanical Sales, Boston Branch of U. S. Rubber Products, Inc.

"West's Gas" Midsummer Competition

West Gas Imrovement Company, 424 Madison Avenue, New York City, now announce the adjudicator's awards in their midsummer competition.

The awards are as follows:

Groups 1—"Coke"

First Prize—J. F. Lord, Darlington England.

Second Prize—F. M. H. Taylor, London, England.

Group 2—"Technical Control"

First Prize—T. B. Glover, Buenos Aires, South America.

Second Prize—A. McDonald, Motherwell, Scotland.

Group 3—"Industrial Gas"

First Prize—J. E. White, Newcastle-on-Tyne, England; W. Hind, Coventry, England.

Group 4—"Gas in the Home"

First Prize—F. C. K. Crockett, Toronto, Canada.

Second Prize—Mrs. Eileen Murphy, London, England.

Group 5—"Tar"

First Prize—R. S. Andrews, West Melbourne, Australia.

Second Prize—A. T. Brown, Sydney, Australia.

The first prize in each group is 20 guineas (approximately $105) and the second prize is 10 guineas (approximately $52).

The Competition number of "West's Gas," which will be published shortly, will contain all the prize-winning articles and also the Adjudicator's Report on all the entries received. Papers receiving Honorable Mention will be reserved for future publication in "West's Gas," the monthly publication of West's Gas Improvement Company.

Crane Promotes Mork

On September 1 Crane Co. announced the transfer of Mr. P. R. Mork from New York to the general office in Chicago, where he will serve as Vice-President in charge of sales. Mr. Mork, who was Vice-President in charge of the New York territory, enjoys a wide acquaintance throughout the industry, having served as manager of the Minneapolis and Duluth branches before going to New York in 1927. In his new position he will assume the duties of Vice-President H. W. Seymour, who is on leave of absence due to ill health.

Mr. P. R. Berryman, formerly Vice-President of the Trenton Potteries, has succeeded Mr. Mork as manager of the New York branch and associate branches of Crane Co. in the metropolitan area.

Welding Clinic Planned

Completion of plans for the holding of a four-day welding clinic in New Orleans starting October 24 has just been announced by The Linde Air Products Company, distributor of materials and equipment for oxy-acetylene welding and cutting.

This will be the fourth large clinic of this type sponsored by this company this year, the others having been held at Birmingham, Alabama; Houston, Texas, and Cleveland, Ohio. The great success and popularity of these previous clinics led to the formation of the present plans, and no efforts are being spared to make the forthcoming clinic even better in every respect than its predecessors.

The purpose of this type of general clinic is to pass on to those interested in oxy-acetylene welding and cutting information on new developments in the industry; to assist those who have welding and cutting problems; to demonstrate and give instruction on new and old applications of the oxy-acetylene process; to afford a chance for discussion and interchange of ideas among those attending.

The New Orleans clinic will be held at the Isaac Delgado Central Trades School, the officials of which are offering all the facilities of the school to take care of the large attendance expected from Louisiana and surrounding states.

Devlin Company Licensed to Manufacture Patented Gas Stove

The Devlin Manufacturing Company, Burlington, New Jersey, announces that they are exclusively licensed in the United States to manufacture a patented gas stove manifold, made of specially rolled pipe.

This special section pipe is built up on two sides to prevent cracking when tapped and to allow it to be threaded deep enough to insure a secure, leak-proof connection.

This news will be of special interest to manufacturers of gas stoves in view of the difficulty experienced in the past in tapping manifolds.

The Thomas Devlin Manufacturing Company are manufacturers of a complete line of Devlin fittings and fretz nipples.

IMPROVED EQUIPMENT ~ RUSSELL ENGINEERING
CORPORATION
24 STATE STREET
NEW YORK
Coal Gas Plants — Horizontal Ovens, Benches, Refills, Additions, Repairs, Charging and Discharging Machines
Oil Gas Plants — "Refractory Screen" Process for Base — Standby or Peak Loads — On Existing or New Water Gas Sets Low or High B. T. U. Gas

GPM
IRON HYDROXIDE

SPECIFY GPM FOR:

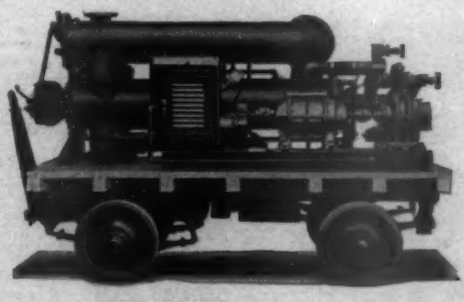
HIGH ACTIVITY
LARGE CAPACITY
QUICK REVIVIFICATION
SMOOTH PLANT PERFORMANCE

Gas Purifying Materials Co. Inc.
Foot of Halsey St, Long Island City, N.Y.
Branch Yard, Providence R.I.

JOHN S. UNGER
GAS ENGINEER
Specialist in Ammonia Recovery
and Manufacture of Ammonia Products
Builder of Unger Ammonia Stills
640 GRACE ST., CHICAGO

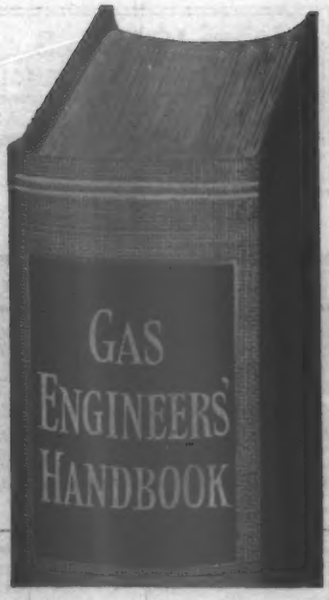
MODERNIZE WITH MOHAWK PRODUCTS
ALL STEEL
MOHAWK HI-SPEED TRAILER
TOOL AND SUPPLY TRAILERS
FOR GAS AND ELECTRIC COMPANIES
HOTSTUF BITUMEN HEATERS
LEAD AND COMPOUND MELTING POTS
Hotstuf
MOHAWK ASPHALT HEATER CO.

THE GOODMAN STOPPER
GOODMAN
USED SINCE 1897
2" HANDLE E. LOCKING SLEEVE
GAS MAIN STOPPER
The Reliable Shut-Off for Street Mains
Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.
Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

"STEAM IS NOT AN EQUIVALENT FOR INERT GAS"

Harrison Purging Machines meet one of the fundamental requirements outlined by the A. G. A. in a recently published report covering purging procedure, namely: "An adequate supply of inert gas." This report further says: "Steam is not an equivalent for inert gas." The attitude evidenced was clearly that now that inert gas units are commercially available, all works equipment containing flammable gas should be purged when removed from service. Write for Bulletin 100-B12.
ROOTS-CONNERSVILLE BLOWER CORP.
12th & Columbia—CONNERSVILLE, IND.
NEW YORK—CHICAGO—POTTSTOWN, PA.
BOSTON—PITTSBURGH—DETROIT—ST. LOUIS—SAN FRANCISCO—LOS ANGELES

PURIFYING MATERIAL — BAGGED, OR IN BULK
Manufacturers of GOVERNORS, APPARATUS and EQUIPMENT
IRON Connelly Iron Sponge and Governor Co. SPONGE
Elizabeth, N.J.
Chicago
1876 [USE THE BENEFIT of 58 YEARS EXPERIENCE] 1934

NOW READY



A big, handy manual

answering hundreds of questions on gas production and utilization

GAS ENGINEERS' HANDBOOK

Prepared by
Gas Engineers' Handbook Committee of The Pacific Coast Gas Association.

Reviewed by the
Technical Section of the American Gas Association, and Endorsed by the
Executive Board of the American Gas Association.

1008 pages, 6x9, with many illustrations, charts and tables. $7.50

THIS comprehensive, up-to-date and authoritative manual gives the gas engineer a reference tool comparable to the standard handbooks in other fields of engineering. Now in one volume are brought together a great many of the constants and formulas which the gas engineer uses most frequently in his work. Every phase of the field is covered including fundamental mathematics; properties of materials, liquids, and gases; heat and combustion; production; testing and measurement; transmission and distribution; and utilization, both industrial and domestic. Draws on latest sources. Includes new material on long transmission lines, design of distribution systems, production and utilization of natural gas, "liquid gases," etc. Endorsed by the Executive Board of the American Gas Association as a "valuable reference book for gas engineers."

Section Headings

1. MATHEMATICAL AND CONVERSION TABLES AND GRAPHS
2. PROPERTIES OF ELEMENTS, COMMON SUBSTANCES, AND ENGINEERING MATERIALS
3. PROPERTIES OF GASES, AIR, STEAM, AND WATER
4. FUELS AND COMBUSTION
5. PRODUCTION OF GAS
6. TESTING AND MEASUREMENT
7. TRANSMISSION AND DISTRIBUTION
8. UTILIZATION OF GAS

Order from

American Gas Journal
53 Park Place, New York

Send me the Gas Engineers' Handbook for 10 days' examination subject to approval or return. Within 10 days of receipt I will send $7.50, plus a few cents for postage and delivery, or return the book postpaid. (We pay postage on orders accompanied by remittance.)

Name .....
Address .....
City and State .....
Position .....
Company .....

(Books sent on approval in U. S. and Canada only)

Index To Advertisers

Alpha Lux Co., Inc. 45
Andale Company 47
Barber Gas Burner Co., The 39
Byllesby Engineering & Managmnt Corp ... 47
Cast Iron Pipe Research Assn. ... Fourth Cover
Chace Valve Co., W. M. 43
Chaplin-Fulton Mfg. Co. 47
Connelly Iron Sponge & Governor Co. 49
Connersville Blower Co. 49
Cruse Kemper Co. 45
Electrolux Refrigerator Sales, Inc. 2
Gas Purifying Materials Co. 49
Improved Equipment-Russell Engr. Co. 48
Isbell-Porter Co. 51
Hotel Chelsea 4
Hotel Montclair 51
Johnson Gas Appliance Co. 45
Kitson Company 43
Lambert Meter Co. 45
Lattner Mfg. Co., P. M. 46
Lavino & Co., E. J. 51
Linde Air Products Company 5
Mohawk Asphalt Heater Co. 49
National Tube Co. 8
Oxweld Acetylene Company 5
Prest-O-Lite Co., Inc., The 5
Reynolds Gas Regulator Co. 39
Robertshaw Thermostat Co. .....Front Cover
Roots-Connersville Blower Corp. 49
Safety Gas Main Stopper Co. 49
Semet Solvay Engineering Corp. 47
Sprague Meter Co. 43
Superior Meter Co. 41
Unger, John S. 49
United American Bosch Corp. 6
Union Carbide and Carbon Corp. 5
Union Carbide Sales Company 5
West Gas Improvement Co. 41

LAVINO OXIDE

High Total Sulphur Absorption at Minimum Cost. Intensely Active.

"THE EFFICIENT PURIFIER"

The Sponge with the large Tough Shavings Always Uniform

LAVINO SPONGE

E. J. LAVINO and COMPANY - BULLITT BLDG. - PHILADELPHIA, PA.

NEW YORK CHICAGO PITTSBURGH

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

INVITATION TO MEMBERS OF THE GAS INDUSTRY

Make your trip complete . . . . Visit

NEW YORK CITY *and stop at the*

HOTEL MONTCLAIR

Lexington Avenue, 49th to 50th Streets

800 Outside Rooms With Bath, Shower, Radio

SINGLE from $2.50

DOUBLE from $3.50

Dine and Dance here every evening in the city's smartest restaurant

CASINO MONTCLAIR

New . . . beautiful. Featuring a famous orchestra and stars of the entertainment world

This is the time of year when New York is at its gayest! The Great White Way is ablaze with lights. The theatrical world has scored hit after hit. The proudest names in opera are singing at the Metropolitan. The shops are crowded with temptations.

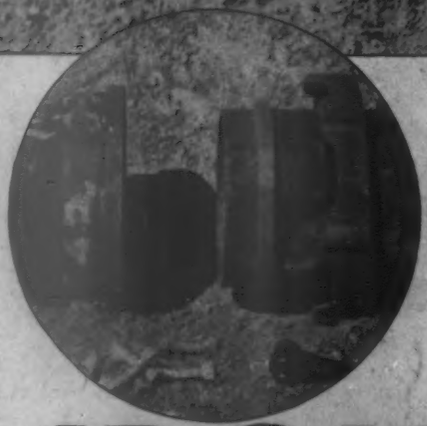
And when you come to New York, enjoy the satisfaction of living in the smart center of town at the Hotel Montclair.

The Montclair is modern, attractive, comfortable. It is convenient to all railroad terminals, to the fashionable shops, to the theatres and to Radio City. And the service is in the finest traditions of the Continent.

Cast iron pipe with gas-tight mechanical joints meets reemployment conditions perfectly, requiring no skilled labor and no tool except a ratchet wrench.

Note the ease and simplicity of installation. Adjust follower-ring and gasket, tighten a few bolts and the job is done.

Several mechanical joints are made by C.I.P.R.A. members. They differ in design but derive from the same basic principle. All are gas-tight in service.



For further data, write to The Cast Iron Pipe Research Association, Thos. F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Illinois.

CAST IRON PIPE

with gas-tight mechanical joints